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Economic competence and financial literacy of young adults. Status and challenges

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Economic Competence and Financial Literacy of Young Adults

Status and Challenges

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Editorial: Economic Competence and Financial Literacy of Young Adults – Status and Challenges

In modern society, the ability to deal with financial and economic matters is becoming increasingly important. This is true for both professionals – e.g., in the investment and banking sectors – and for individuals responsible for managing their financial and economic affairs in everyday life (Aprea et al., in press). This ability is generally described as economic competence, economic literacy or financial literacy. Despite the importance of these constructs, there is still a lack of clarity regarding the exact definitions, and specifically, which components they cover in detail. Furthermore, the terms economic competence and financial literacy are only loosely coupled. Economic competence is usually considered to be more comprehensive than financial literacy. However, recent research on financial literacy has followed a broader approach as well.

The increasing relevance of these competences is driven primarily by various socio-economic factors currently challenging most industrialised countries (OECD, 2005; e.g. structural changes in the financial services and in the labour market, decline of the welfare state, as well as demographic change). As a result, a wide-ranging transfer of risk from governments and employers to employees and consumers has occurred (e.g., reduced state-supported pensions, reduced health-care benefits). This imposes the responsibility to care for current and future financial security onto individuals. Furthermore, it is important that individuals using financial intermediaries and advisors understand the services that are being offered. This is particularly important for adolescents and young adults, as younger generations are more likely to have to bear more financial risks in adulthood than their parents. Finally, financial and economic issues play a vital role in current conceptions of citizenship education.

This book will concentrate on economic competence and financial literacy of young adults in the US, Europe and South America. The subjects of the research are mainly individuals who have begun an apprenticeship or university education. Economic competence and financial literacy are of special interest for this group because they are usually in the unique position of being responsible for managing their own financial affairs autonomously, often for the first time. Furthermore, economic competence is key to social participation and active citizenship.

Overview

The book contains two sections – the first section delves into financial literacy.

The first paper describes the development of a comprehensive financial literacy framework. This is followed by three papers that present results on different facets of financial literacy, starting with students' understanding of the financial system in the UK, and followed by results on financial literacy and financial behavior among young adults in the US, and finally, financially literate decision making in first-time homebuyers.

Section two of this book covers different facets of economic competence. This section opens with two papers analyzing economic competence, specifically the factors influencing the economic competence of students in upper secondary education. The first paper examines learners' economic competence in Switzerland and the second paper focuses on the effects of students' sociocultural background on economic competencies.

The following two papers concentrate on apprentices in the German dual system of vocational education. Their focus is on the importance of economic competencies as key elements of vocational development and on opportunity recognition as part of intrapreneurship competence. Finally, the last two papers are concerned with higher education, namely the increasing heterogeneity in business and economics students' prior knowledge and the necessity for teacher education to include a strong foundation in economics.

The following overview will briefly introduce each paper. We will outline the definition and characteristics of the underlying construct (financial literacy or economic competence), the research question, key findings and implications. We will also note connections between the two underlying constructs (economic competence to financial literacy or vice versa).

Section I – Financial Literacy

(1) Seraina Leumann, Michael Heumann, Fatima Syed, and Carmela Aprea: Towards a Comprehensive Financial Literacy Framework: Voices from Stakeholders in European Vocational Education and Training

The authors present a definition of financial literacy that includes individual and systemic facets as a basis for their comprehensive framework of financial literacy. The individual facets cover financial decisions in daily life, and counselling and sales situations focused on the consumer. Based on a systemic orientation, the approach also covers contextual issues of the economy

and society, as well as economic and political framework conditions (second facet). Furthermore, both facets address cognitive (knowledge, skills and abilities) as well as non-cognitive (emotional, motivational and volitional) aspects of financial literacy. With this holistic approach, a series of interviews were conducted with experts to answer two research questions: (1) How do experts and stakeholders elaborate different facets of financial literacy within a holistic framework? (2) How important do experts consider each facet to be? Results show that a broad view of financial literacy is seldom present, as the inter-viewees generally focused on individual cognitive components, neglectting systemic and non-cognitive facets. Consequences are discussed in the paper.

(2) Peter Davies, Fatima Syed, and Lindsey Appleyard: Secondary School Students' Understanding of the Financial System

Comparable to the approach of Leumann and her co-authors, Davies et al. base their work on a comprehensive definition of financial literacy. This definition goes beyond financial literacy as a matter of personal responsibility, and includes the understanding of public money management and financial sector behaviour. Against this background, the authors conducted a number of interviews to investigate what conceptions young people hold about debt, risk, interest payments and time preference. Furthermore, the authors analyzed to what extent these conceptions are consistent across different contexts (such as individual, government, and banking sector). Their results identify several inconsistencies in young people's conceptions, and show fragmentation and misconceptions limiting students' thinking about public finances. Consequences and further research questions are addressed in the paper.

(3) Elizabeth Breitbach and William B. Walstad: Financial Literacy and Financial Behavior among Young Adults in the United States

The focus of this study is on financial literacy and financial behavior of young adults. Financial literacy is seen as a matter of responsibility for finance-related decisions of people, especially of young adults in the United States. The data used in the study is taken from the "National Financial Capability Study" (NFCS). The survey includes questions about financial behaviors related to matters like credit card use, household purchases, bank accounts, student loans, and retirement saving. In addition, the survey contains questions for measuring an individual's financial literacy. The results show that young adults in the US have significantly lower levels of financial

literacy than middle aged or older adults. Within the sample of young adults, females, minorities, and individuals with low levels of education and income were found to have especially low financial literacy. The NFCS data set was also used to study the relationship between financial literacy and different financial behaviors. In line with previous assumptions, young adults with higher levels of financial literacy are less likely to exhibit costly or problematic financial behaviors.

(4) Bärbel Fürstenau, Mandy Hommel, Claudia Leopold, Héctor Ponce, and Mario López: Analysis of Banks' Online information Regarding Mortgages as a Basis for Financially Literate Decision-Making in First-time Home Buying

The authors base their article on the widely recognized definition of financial literacy as "knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life" (OECD 2013: p. 144). They argue that in order to make responsible decisions, individuals need to be familiar with concepts, procedures, effects, and risks related to complex financial products. The authors believe it is not sufficient to rely on the recommendations of financial product providers. They list home purchases and mortgage loans as two specific examples of fields that require financial literacy. Consumers often rely on information and calculators provided online, often by banking institutions. Against this background, the authors investigate possible similarities and differences between bank calculators within and across countries. They explore whether differences between banks' calculators and reference calculators exist. Their results show that the calculators differ remarkably between countries, sometimes being far from the recommendations.

Section II – Economic Competence

(1) Doreen Holtsch and Franz Eberle: Learners' Economic Competence in Switzerland: Conceptual Foundations and Considerations for Measurement

This paper presents and applies a competence structure model to commercial apprentices. The authors provide a comprehensive understanding of economic competence, which has been developed within the framework of the

Swiss Leading House *Learning and Instruction for Commercial Apprentices* (LINCA). The definition comprises both cognitive and non-cognitive aspects. In line with the objectives of Swiss economic education, two domains are taken into account: a civic-economic and a commercial domain. Finally, within these dimensions, domain-specific and domain-related competencies are differentiated and specified. Instruments to measure economic competencies have also been developed.

(2) Andreas Jüttler and Stephan Schumann: Effects of Students Sociocultural Background on Economic Competencies in Upper Secondary Education

There is a large amount of research focusing on sociocultural effects within educational systems, but a shortage of research on economic competencies. This paper aims to address this gap by providing deeper insights into the relationship between learners' sociocultural characteristics and economic competencies. The research analyzes data from a representative sample of high school graduates from Baccalaureate Schools and Federal Vocational Baccalaureate Schools of the German speaking part of Switzerland (N = 2.348). A broad definition of cognitive and non-cognitive dimensions is used to measure economic competencies. The results show that differences in economic competencies are mainly explained by the school profile (such as a commercial vs. non-commercial school profile). In addition, migration background variables influence competencies. However, the effect is rather small. No significant effect for other sociocultural variables can be observed.

(3) Esther Winther, Dagmar Festner, Julia Sangmeister, and Viola Katharina Klotz: Facing Commercial Competence: Modeling Domain-Linked and Domain-Specific Competence as Key Elements of Vocational Development

The study aims to identify the relationship between domain-linked and domain-specific competencies. Both types of competencies are seen as crucial elements of vocational competence for apprentices in commercial domains. A comprehensive model, including both domain-specific and domain-linked vocational competencies is used. Using a computer-based test environment, competences of N = 468 industrial apprentices were assessed. Results show that domain-linked competences significantly influence the mastery of commercial and economic situations at the workplace. Furthermore, there is evidence that commercial competence can be distinguished into a domain-linked and domain-specific dimension.

(4) Christine Weiß and Susanne Weber: Opportunity Recognition as Part of Intrapreneurship Competence – An Analysis of Exam Essays of German Industrial Clerks

In this paper, the authors address the importance of opportunity recognition within VET as part of intrapreneurship competence. The paper frames the topic around fundamental political, socio-economical and educational changes. The researchers use a broad understanding of intrapreneurship on an individual level whereby continuous innovations are seen as the result of intrapreneurial thinking and acting. Furthermore, the authors provide a three-stage model of opportunity recognition, which is based on an evidence-centred assessment design and combines convergent and divergent thinking. The study focuses on industrial clerks at the end of their three-year vocational training program in Germany. The results indicate that opportunity recognition is very important for enterprise success as well as for trainees' ability to shape their occupational career autonomously. Additionally, an objective, reliable and valid model of opportunity recognition is provided by the authors, which can be used for future research.

(5) Roland Happ, Olga Zlatkin-Troitschanskaia, Klaus Beck, and Manuel Förster: Increasing Heterogeneity in Students' Prior Economic Content Knowledge – Impact on and Implications for Teaching in Higher Education

The authors address the issue of increasing heterogeneity among business and economics students in higher education, especially when it comes to prior content knowledge. A longitudinal multi-level model was developed to explain differences in economic content knowledge of students over time. The German adaption of the widely used Test of Economic Literacy (TEL, Soper & Walstad, 1987) by Beck and Krumm (1998) was used to measure students' economic knowledge. Students' prior knowledge was identified based on their educational background. The authors found that students' initial knowledge, especially prior content knowledge, had a significant influence on academic achievement. The research indicates the importance of providing teachers with formative performance assessments, and information about students' prior knowledge. Finally, the impact of teaching methods such as "Just-in-Time"-teaching or tailor-made preparation courses for students are discussed.

(6) Christin Siegfried: The Necessity for Well-Founded Teacher Education in Economics – Findings from Curriculum Analyses

Due to the increasing importance of economic knowledge in modern society, it is argued that economic education should be offered in general education. This implies that teachers in general education should receive an economic education themselves. In Germany, most federal states have implemented economic education in schools, however, teacher education shows some deficits. By analyzing school curricula (middle and grammar school) and university based learning opportunities, the author presents notable discrepancies between university and school curricula. Deficits also exist in middle and grammar schools curricula. The initial results suggest that prospective teachers in the field of economics lack teaching qualifications (especially content knowledge). Therefore, the development of adequate school and university curricula are important to match prospective teachers' to the needs of students in economic education and the demands of a modern society.

Outlook

The papers in this volume represent different approaches to measure and analyze financial literacy and economic competence. It becomes apparent that the conceptualizations are quite different. Some concepts are more comprehensive (such as the approaches to financial literacy presented by Leumann et al. and Davies et al. or the approach of economic competence presented by Holtsch & Eberle and Jüttler & Schumann), whereas others focus more strongly on specific facets of a respective competence (for example, Fürstenau et al. with home buying as one facet of financial literacy or Happ et al. with economic knowledge as facet of economic competence).

The increasing trend in identifying financial literacy as a broad construct, demonstrates the need for a systematic alignment with the concept of economic competence. The first step towards this is a stronger mutual consideration of literature on these concepts. So far, both strands are only loosely coupled. Furthermore, a stronger interrelation of financial literacy and economic competence will have major implications for measurement, results (and their interpretation) and for the development of support strategies in educational and private contexts.

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Eveline Wuttke, Stephan Schumann, and Jürgen Seifried

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Section I:
Financial Literacy

1 Towards a Comprehensive Financial Literacy Framework: Voices from Stakeholders in European Vocational Education and Training

Seraina Leumann, Michael Heumann, Fatima Syed and Carmela Aprea

1.1 Introduction

In modern economies, the ability to reasonably deal with money and financial matters is becoming increasingly vital – not only for professionals in the sector of investment and banking, but for every individual responsible for managing his or her financial affairs in everyday life. The ability to manage personal finance well comes under the umbrella of "financial literacy". The increasing importance of financial literacy is driven primarily by various socio-economic factors currently challenging most of the European (and other industrialized) countries. Among others, these include structural changes in the financial services and in the labour market; decline of the welfare state; and last, but not least, demographic change. This has resulted in the transfer of risk from the government to the individual in the shape of reduced state-supported pensions and health-care benefits. As a consequence, individuals are increasingly becoming responsible for planning and managing personal events such as illness, unemployment or retirement. Furthermore, if individuals use the services of financial intermediaries and advisors, they need to understand what is being offered to them as even standard procedures like electronic payments, which have replaced face-to-face transactions, require a certain amount of financial knowledge and skills. All this is growing in importance as far as adolescents and young adults are concerned mainly because younger generations are more likely to have to bear greater financial risks in adulthood than their parents. In addition, they are consumers of financial services such as online payment, mobile phones etc. from a young age (cf. Reifner 2011). Last but not least, knowledge and understanding of national financial and economic policy and its implication on citizens play a vital role in current conceptions of citizenship education. Young people need to be empowered to play an active democratic role as well as develop a broader understanding of the financial world (cf. Davies 2006). Given the fact that in many European countries, a substantial number of young adults enters vocational education (e.g. 75 percent in Switzerland,

more than 60 percent in Germany, about 78 percent in Austria and nearly 50 percent in Italy; OECD 2014), the context of Vocational Education and Training (VET) could play an essential role in the promotion of financial literacy. This fact, in turn, presupposes the availability of an educationally sound and holistically encompassing conceptual framework for guiding the diagnosis of financial literacy and promoting the development of financial education interventions.

Despite the high relevance and actuality of this topic; however, it is still largely unclear how the underlying construct can be adequately conceptualised from a (vocational) education perspective that includes not only functional aspects but considers the whole person, and particularly his or her development of interests and values as well as his/her role as citizen. Against this background, the aim of the research presented here is to contribute to the elaboration of a holistic conceptualisation of financial literacy encompassing the above-mentioned personal, emotional and national aspects. A possible approach for addressing this goal, in addition to a thorough literature review, is the consideration of key stakeholders' views. In this paper, an interview study will be presented that was carried out against the backdrop of a review and analysis of international research literature on conceptualisations of financial literacy and the resulting construct dimensions. The study is based on the reconstruction of perspectives of financial literacy of stakeholders in VET and from the financial sector dealing with finance education.[1] The focus of interest is firstly on the perceived facets of financial literacy and secondly, on the appreciation of their importance. The results will help to further elaborate the concept of financial literacy and form the basis for the development of diagnostic instruments for the assessment of financial literacy in VET contexts. Based on assessment results, appropriate learning arrangements for the target group can be developed as the next step.

1.2 Existing Conceptualisations of Financial Literacy

The conceptualisation of financial literacy can be located within the international research literature under three main strands. Each one depicts a specific model of a financially literate person with specific educational concepts (cf. Aprea 2014).

1 This paper is an extended version of the contribution by Aprea et al. 2015. Besides focusing on different parts of the interviews, an enlargement of the data base is provided here. Whereas the latter contribution exclusively embraces stakeholders from German speaking countries, the present paper gives more encompassing insights by including voices from Italy, Portugal and the UK. With this we intended not only to further substantiate and/or differentiate our interpretations but also to make a first attempt to compare different European countries.

1.2.1 Manager of personal finance

This direction is currently the most diffused conceptualisation of financial literacy. It is basically oriented towards financial decisions made in personal life, including budgeting, everyday payments, use of credits, insurances of life risks, wealth building and retirement provision (e.g., Schlösser et al. 2011). The emphasis is on making rational and well informed choices. The general princicple of this group of conceptualisations is expressed in the following quotation by the former American Federal Reserve chairman, Ben Bernanke: "The recent crisis demonstrated the critical importance of financial literacy and good financial decision making, both for the economic welfare of households and for the soundness and stability of the system as a whole. Good financial choices depend on reliable and useful information, presented in an understandable way. *Essential components of personal financial management include an understanding of how to budget strategically, use credit, save to build personal wealth, and shop for and choose suitable financial products."* (Bernanke 2011; emphasis added). Educational efforts would then specifically focus on strengthening the knowledge and understanding of financial facts important for personal finance management.

The conceptualisation of financial literacy as personal finance management tool is reflected for instance in the Pisa 2012 Financial Literacy Framework launched by the OECD, which is based on the following definition: "Financial literacy is knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life." (OECD 2012: 13).

Conceptualisations of financial literacy as personal finance management tool attempt to focus on central decision-making areas of financial literacy. Therefore, they, potentially, are more likely to represent and predict decision-making behaviours than knowledge-related conceptualisations. Nevertheless, because they are restricted to personal financial aspects, they are flawed with a central problem regarding the desideratum of a holistically oriented approach towards financial literacy education, as mentioned in the introduction.

1.2.2 Informed consumer

Some conceptualisations of financial literacy broaden the perspective of personal finance management by including the aspect of responsible and critical consumption in a financial context. Besides the ability to critically reflect and purposefully control own needs and buying decisions, special reference is made here to the functions and interests of financial services providers. Fol-

lowing this approach, a central objective of financial education would be the reduction of information asymmetries in the advice and sale of financial products. This also includes information on consumers' rights and obligations. Thus, the central element in such a conceptualisation is the consumers' relation to other actors in a financial context. Therefore, we term conceptualisations within this group also as *relational approaches of financial literacy*. In the Anglo-Saxon world this is, for instance, the view of Atkinson et al. (2007) or Rutledge (2010). In German-speaking countries, this position is represented by the Institute of Financial Services (iff) which regards financial literacy education as "the critical, user-oriented conveying of common knowledge, understanding and social action competence in dealing with financial services built on credit facilities, which people use for themselves outside their professional sphere in order to reasonably combine income and expense, work and consumption throughout their lifetime" (Reifner 2008).

As emphasized, for instance, by Neumaier (2012), this conceptualisation might be vulnerable to an abusive functionalization, principally when financial literacy is seen as an alternative to structural and systemic regulatory procedures, and individual financial problems. As a result, negative macroeconomic developments are then accordingly ascribed to personal failure or attributed to personal responsibilities. Such a deficit orientation does not only contradict the educational intention focused on in this article, but also disregards available theoretical and empirical evidence, especially relating to more structural causes of private over-indebtedness (e.g. Meier-Magistretti et al. 2013) or to the development of financial crises (e.g. Krugman 2008). However, in order to be able to appropriately judge these complex relations, this conception of financial literacy that is oriented towards the strengthening of consumers' power has been integrated into a wider structural perspective that is discussed in depth in the following section.

1.2.3 Responsible economic citizen in financial issues

The conceptualisations belonging to this group particularly focus on the ability to understand and participate actively in a democratic economic and financial system. As already mentioned, they place financial literacy into a wider context of economy and society, where citizens are addressed not only as recipients, but also as co-creators of the conditions of the larger economic and political framework. Therefore, we may term this group of conceptualisations also as *systemic approaches of financial literacy*. An integrative example from the Anglo-Saxon world is offered by Davies (2015), according to whom a central task of financial literacy is to enable voters to "have sufficient understanding of financial processes and incentives to create a climate of pressure for politicians which makes it more likely that [they] govern in

the public interest" (p. 312). Further examples from the German speaking countries are provided by Hippe (2012) and Remmele and Seeber (2012), who both highlight the embeddedness of financial and economic issues into an economic or socio-economic framework. Furthermore, similarities can also be identified between this third group of conceptualisations on financial literacy and certain approaches to economic and civic competence in the German language region (Dubs 2014, Eberle 2015, Schank & Lorch 2014, Schumann & Eberle 2014, Ulrich 2007).

The conceptualisations that view financial literacy as part of an extensive economic or socio-economic framework can be considered as the most encompassing ones and, at the same time, the most useful ones for the educational objective pursued here. However, the current conceptualisations of financial literacy do not seem to take into account the emotional and motivational factors behind financial decisions as well as questions regarding related social values and norms. Taking into consideration findings from cognitive psychology (e.g., Gigerenzer 2008), brain research (e.g., Damasio 2006) and conceptual change studies (e.g., Sinatra & Mason 2008), the omission of these aspects seem questionable as factors influencing (financial) behaviour and learning and development processes are an important aspect of financial literacy. Our study, thus, takes into account that the construct of financial literacy is not exclusively informed by cognition. Attitudes (e.g., towards money, cf. Barry 2014) and motivational aspects (e.g., the ability to delay gratification, cf. Wuttke & Aprea 2014) play an important role as well.

1.3 A Holistic Approach to Financial Literacy: A Four-Facet-Framework

Against the backdrop of the presented considerations, two dimensions of financial literacy can be discerned – "content" and "personal resources". The first dimension of "content" comprises, in terms of a continuum, the characteristic "individual vs. systemic". This dimension refers to the first two types of concepts of financial literacy outlined above. The characteristic "individual" focusses on the individual as a consumer making financial decisions in personal and market environment whereas the characteristic called "systemic orientation" subsumes issues of the larger context of economy and society as well as economic and political framework conditions. On the other hand, the second dimension of "personal resources" contains the characteristics "cognitive" and "non-cognitive". "Cognitive" refers mainly to knowledge, skills and abilities. Non-cognitive dispositions imply emotional, motivational and volitional aspects as well as social values and norms, which can also be un-

derstood as personal traits and characteristics.[2] Based on these dimensions, four facets of financial literacy are emerging: individual cognitive, individual non-cognitive, systemic cognitive, systemic non-cognitive. These four facets underlie the following study as they form the basis for the analysis scheme (see in detail http://www.flinevet.eu).

Following a holistic approach to financial literacy, the central aim of the interview study was to analyse key stakeholders' views on the above mentioned four facets of financial literacy and on their respective importance. The research questions, therefore, are the following:

(1) How do the key stakeholders elaborate the four facets of financial literacy within a holistic framework?

(2) What importance do they attribute to each facet?

A further aim of this approach was to fill out the analysis scheme with content that can be used, in future, to create test items.

1.4 Method

The interview study was conducted in the context of the EU Leonardo Da Vinci Lifelong-Learning-Project "Financial Literacy in European Vocational Education and Training (FLin€VET)". The project brought together a group of partners with different missions and expertise in VET practice and research (e.g., Universities, VET Providers, Teachers and Teacher Trainers, Associations dealing with VET and labour market) from six different countries, namely Austria, England, Germany, Italy, Portugal and Switzerland.[3] The overall aim of the project was to analyse conceptualisations and curricula in the area of financial literacy in different countries.

Sample of the interview study: With regard to the sampling of the participants, three groups of key stakeholders with different points of contact with the financial (vocational) education context were identified: (1) finance education experts, who are involved in the development of teaching materials or in the provision of consultation to concerned adolescents, (2) VET teachers and company trainers, who teach financial issues at VET schools or in training companies, and (3) VET students, who are the directly affected target

2 With the term "non-cognitive" we want to contrast conceptions that solely consider cognitive aspects such as knowledge, abilities and skills. Of course we are aware that this distinction is of analytical nature, and that non-cognitive aspects such as motivation and attitudes also contain cognitive elements.

3 Further information about the project can be found on the project website (http://www.flinevet.eu).

group. At least two representatives per group were chosen for an interview in each of the six participating countries. All participants were known to the project partners by previous contacts, and therefore, must be considered as a convenience sample. A total of 40 interviews were conducted. Of these, 14 interviewees are from the financial sector dealing with finance education (five from Germany, three from Switzerland, two from England and Portugal and one from Austria and Italy), working as managing or employed debt counsellors or other financial specialists such as representatives of the national and private banks. 12 interviewees (two per country) teach either professional or general education at VET schools. Another five interviewees (three from Germany and one from Austria and Portugal) are trainers in companies in the gastronomic, health and commercial sector. Finally, nine interviewees (two from Austria, England, Portugal and Switzerland and one from Germany) are VET students from the "car", "restaurant", "health care", and "commercial and administration" industry. The interviewees were between 17 and 58 years old and, of which 45 percent were women.

Data collection: The interviews were conducted using an interview guide and following a two-step procedure. (1) First step involved determining the participants' conceptions of financial literacy by asking questions such as "how do you define financial literacy", and "what do you think a young adult/VET student should be able to do in order to be called financial literate"?, (2) This was followed by showing them our financial literacy framework including the four facets discussed above. The interviewees were then asked, among others, the following two questions:

a) If you look at the different components of our framework, in your opinion, which cognitive (knowledge, skills, abilities) and non-cognitive (interests, attitudes, values) resources does a young adult/VET student need …
   - to be capable of managing his/her own money adequately?
   - to be a well-informed consumer and a responsible citizen in financial issues?

b) Which aspects of financial literacy do you consider as the most important, and which should, therefore, be necessarily included in a financial literacy conceptualisation?

In this paper we will exclusively focus on the second question, i.e. the elaboration of the scheme with the four facets of financial literacy and their respective importance.

Interviews were conducted between January and March 2014 and lasted 33 minutes on average. All interviews were audio recorded and transcribed. In the case of Portugal and Italy, the transcripts were translated into English.

Therefore, the database was available either in German or in English, which was necessary as Swiss researchers did the coding.

Data analysis: The coding and analysis of the interview transcripts were carried out mainly by two researchers using the N-Vivo software tool, and was based on descriptive and interpretive content analytical procedures (e.g. Krippendorff 2012). More particularly, data analysis proceeded according to the following steps: After (1) the agreement of a shared understanding of financial literacy among project partners, (2) a global structure of the analysis scheme was established, taking into account the four facets listed above. Followed by, (3) a selection of interview transcripts from Germany and Switzerland (one per different respondent group, i.e. financial counsellors/experts, VET teachers and trainers, and VET students) were read and relevant text passages excerpted. These text passages were then (4) aggregated into categories in an inductive process as well as (5) compared with conceptual approaches from the literature in a deductive process. This was followed by (6) the establishment of coding rules and anchor examples before (7) the analysis scheme was applied to transcripts of the remaining interviews and, if necessary, revised. Finally, (8) data was interpreted and compared between countries and between groups of respondents. 25 percent of the interview transcripts were double coded. The interrater reliability is .85, which can be considered as very good.

1.5 Results

In this section, we will first present results from the interview study on how the participants elaborated upon the four different facets of financial literacy, and then report findings regarding their judgements of the respective relevance of these facets. In addition, preliminary analyses of differences between the six countries and the three respondent groups will also be presented.

1.5.1 Elaboration of the four financial literacy facets

The analysis of the interview data provided a substantive elaboration of the *individual cognitive* and the *systemic cognitive facet* into different topic areas. In contrast, the elaboration of the non-cognitive facets was less sophisticated.

The individual cognitive facet (cf. Table 1) dominates the responses across all countries and respondent groups. Of the total of 852 statements coded across all 40 interview transcripts, 408 (48%) could be assigned to the

individual cognitive facet and were mentioned at least once by 39 of the 40 interviewees (n = 39), while 235 (28%, n = 36) statements could be assigned to the systemic cognitive facet.[4] In contrast, the two non-cognitive facets played a rather minor role (individual non-cognitive 15%, n = 36; and systemic non-cognitive 9%, n = 31), and could not be further differentiated into subcategories due to the relatively small number of responses.

Within the *individual cognitive* facet, the most prominent topic area is (1) "planning and managing financial matters" that is prominently represented with approximately 38 percent of the total number of assignable individual cognitive statements (n = 34). As indicated in Table 1, this aspect of financial literacy can be further subdivided into the following sub-categories: The most commonly named one is (a) "drawing up a budget" (11 percent of the total number of assignable individual cognitive statements, n = 16). The following interview excerpt illustrates this point clearly: "the management of one's budget, that is to know how much I earn, to know how much I spend, to know how to define a percentage of savings" (Portuguese interview #7, debt counsellor). A further subcategory is (b) "using banking and financial services for daily needs" (9%, n = 19). This mainly includes general knowledge about the function of banks, how to open a bank account, or how to invest and withdraw money. Further subcategories are: (c) "planning expenses in accordance with own needs and possibilities" (n = 14) and (d) "evaluating own revenues" (n = 17), with 6 percent each. The following example for the former brings it to the point: "If I have money, I buy, if I don't have money, I don't buy" (Portuguese interview #2, VET student). A typical example for the latter is expressed in the following excerpt: "When they get their pay slips it is important for them to understand how much money they are being paid and what are all these deductions on their payslips" (English interview #6, VET teacher). Other relevant topic areas under the individual cognitive facet are: (2) "saving money/building assets" with 19 percent of the responses (n = 29), (3) "spending money" (16%, n = 23) and, last but not least, (4) "borrowing money/raising a credit/financing methods" (9%, n = 21). "Retirement planning" (5%, n = 14), "prevent (over-)indebtedness" (4%, n = 9), "knowing information and counselling services in the context of money and financial affairs" (4%, n = 8) as well as "earning/taking money" (3%, n = 8) and "comparing/contracting assurances" (2%, n = 6) are further categories that have been mentioned less frequently than the ones mentioned above.

4 Repeating statements by the same respondent within any specific facet and subcategory were explicitly taken into consideration and thus counted multiple times to that facet/subcategory.

Table 1: Elaboration of topic areas for the individual cognitive facet of financial literacy

	Category with sub-categories (percent of total references, number of interviewees)		Operationalization	Anchor examples from transcripts
Individual cognitive	Earning / taking money (3%, *n* = 8)		To identify various sources of income (wages, public services, secondary income etc.)	Knowing existing social security benefits and/or rebates, especially with scarce finances
	Planning and managing financial matters (38%, *n* = 34)	Evaluating own revenues (6%, *n* = 17)	To know the personal sources of income and thus to assess the available money for current consumption	Knowing payroll deductions
		Planning expenses in agreement with own needs and possibilities (6%, *n* = 14)	To weigh personal needs and shopping desires based on financial resources and to plan how to spend the money	Rethinking consumer behaviour and bringing it in accordance with available funds
		Gathering short-term reserves of money (3%, *n* = 7)	To consider short-term reserves in planning own finances (short-term reserves)	Planning of major, predictable expenses (e.g. medical consultation)
		Drawing up a budget (11%, *n* = 16)	To compile and check revenues and expenditures	Having an overview of own monthly expenses
		Using banking and financial services for daily needs (9%, *n* = 19)	To use everyday banking services that are relevant for planning and man-aging financial matters)	Knowing what it means to have a bank account
		Dealing with credit cards (2%, *n* = 5)	To use the credit card as a possible means of payment in everyday transactions (short-term borrowing of money)	Knowing dangers of overrunning credit cards
		Filling out tax declaration (1%, *n* = 2)	To regard taxes in the planning and management of one's own finances.	Knowing how to fill out a tax declaration

Spending money (16%, *n* = 23)	To carry out and control everyday financial transactions. It is about purchasing behaviour	Price comparisons when buying clothes
Prevent (over-)indebtedness (4%, *n* = 9)	To know, assess (and avoid) risks of (over-) indebtedness in carrying out every day financial transactions	Knowing traps leading to indebtedness
Saving money / building assets (19%, *n* = 29)	To save or invest money in order to build assets (medium-term reserves)	Knowing the risk and return of different forms of investment
Borrowing money / raising a credit / financing methods (9%, *n* = 21)	To borrow money which has to be repaid in regularly occurring instalments over a longer time (credits, leasing, mortgage)	Knowing different financing methods for a new car and assessing advantages and disadvantages
Retirement planning (5%, *n* = 14)	To form long-term reserves to make provisions for retirement age	Knowing saving methods for retirement
Comparing / contracting assurances (2%, *n* = 6)	Any kind of insurance products (car insurance, life assurance etc.) to cover risks	Comparing health insurances of different providers and choosing the one which fits the best for own needs
Knowing information and counselling services in the context of monetary and financial affairs (4%, *n* = 8)	To know information and counselling services or web pages in the context of monetary and financial affairs to get information or help when needed	Knowing where to get help with a financial problem

Total of assignable references: 397

(11 references excluded due to inability of exact sub-category assignment), *n* = 39

Based on the responses of the participants, the systemic cognitive facet can be elaborated as well (cf. Table 2).

Table 2: Elaboration of topic areas for the systemic cognitive facet of financial literacy

	Category with sub-categories (percent of total references, number of interviewees)	Operationalization	Anchor examples from transcripts
Systemic cognitive	Contexts of monetary and financial policy (20%, *n* = 22)	Contexts/relations which concern economic measures of a central bank or general monetary measures (exception taxes: own category)	Understanding inflation Shift of base rate
	Contexts of real economy (15%, *n* = 11)	Contexts/relations which concern the real sector or real economic parameters (e.g. employment, production)	Be familiar with the concept of GDP
	Economic contexts / relationships in general (30%, *n* = 31)	Remaining macroeconomic relations/parameters	Understanding economic news in the newspaper
	Knowledge about financial facts (2%, *n* = 5)	Factual knowledge about the financial context	Knowing the current inflation rate
	General conditions of the political system (9%, *n* = 17)	Political contexts associated with economic issues such as voting, elections, etc.	Be informed about forthcoming votes in respect of financial topics
	Social security system (9%, *n* = 11)	Statutory insurance system for old age, unemployment, illness and other risks	Understanding the system of unemployment benefits
	Tax system (15%, *n* = 16)	Contexts/relations which concern the tax system/fiscal measures of a geopolitical region (e.g. country)	Knowing what is done with the taxes
	Total of assignable references: 231 (4 references excluded due to inability of exact sub-category assignment), *n* = 36		

Within the *systemic cognitive* facet, two topics turned out to be the most significant. These are (1) the "economic contexts/relationships in general" with 30 percent of the clearly assignable systemic cognitive references (n = 31) and (2) the "contexts of monetary and financial policy" (20%, n = 22). Moreover, other aspects are cited which can be subsumed under (3) "tax system" (n = 16) and (4) "contexts of real economy" (n = 11), each with 15 percent of the total number of clearly assignable systemic cognitive references, (5) "general conditions of the political system" (n = 17) and (6) "social security system" (n = 11), with 9 percent each, as well as (7) "knowledge about financial facts" (2%, n = 5). In contrast to the individual cognitive aspects, it is striking that there is a relatively large heterogeneity in terms of level of detail and reflectivity within the different topic areas of the systemic cognitive facet; whereas, for example "knowledge about the market economy, to know what is going on at the stock exchange" (German interview #1, company trainer) is a vague formulation that leaves much room for interpretation. The following excerpt is very specific and characterised by a high reflectivity: "To include Fairtrade to some extent and then to discuss with the young adults, what they think how that is supposed to end when certain companies sell T-Shirts for three Euros. The clothing company should earn something, the seamstress should get something, then the cotton producer wants to have something and to discuss the whole thing a little bit more on global scale. And often it is the case that brand manufacturers permit producing in low-wage countries and often there is no difference. Thus, to walk through the world with one's eyes opened" (Austrian interview #5, VET teacher).

An in-depth analysis of the utterances regarding the cognitive systemic facet, furthermore, revealed that some interviewees portray macroeconomic issues rather instrumentally in their function to serve personal purposes such as asset accumulation or success in the job market; whereas others see it in a more integrative way from the perspective of a responsible citizen for whom systemic knowledge is personally important, but also serves socio-economic purposes outside the sphere of mere economic logic and can be actively used to shape one's economy and society through participation and one's personal financial behaviour. This can be illustrated by the following two interview excerpts which were both coded to the field "economic contexts/relationships in general": "I feel a great difficulty, no doubt, of young people doing that analysis of the impact of economic issues and in the micro context. […] And I always try to make that connection; I try to explain that if we produce more it is possible to create more jobs. Creating more jobs, we have greater potential to have people with income from work and as a result there is more money in circulation, there is more consumption" (Portuguese interview #1, VET teacher) and "That in the end one is an economic community in the same country after all and that all are suffering, when the country is suffer-

ing. Or that all, unfortunately not all, but at least many, profit when an economy is prospering“ (Swiss interview #3, VET teacher). Whereas in the first statement, systemic aspects are expressed in a functional way within the economic system, the second one adopts a more integrative and socio-economic perspective.

Within the *individual non-cognitive* facet, interest and awareness for (personal) financial matters as well as attitudes and values towards handling money in general are frequently represented. This is expressed in the following example: “to be able to build an autonomous opinion on different financial issues such as bank accounts, not just according to each one’s values but also on the affective, motivational and emotional level” (Italian interview #3, VET teacher). Further, the participants bring up aspects such as discipline, self-control and delay of gratification, scepticism, e.g. towards commercials and the seduction of advertising, entrepreneurial attitude in one’s private life and responsible consumption. As stated above there are not enough utterances and they are too heterogeneous to construct subcategories.

Concerning the *systemic non-cognitive* facet, participants frequently mentioned a positive attitude towards gathering information about financial and political-economic events and the willingness to participate as a citizen. The following two excerpts serve as typical examples: “Indeed financial literacy is functional to understand a number of processes, also social ones and not just economic, whose understanding is essential to orient oneself in exercising citizenship. Therefore, I should say that I’m good with the PISA definition (a complex of knowledge in the economic, financial and mathematical sphere), but I would rather widen the object of this literacy to consciously exercising duties and rights of citizenship and active participation in society“ (Italian interview #3, VET teacher) and “what does it actually mean, when everyone just buys the cheapest products, it is a system after all, that cannot function like this. Therefore you try a little bit to promote critical thinking in this regard. In order to question if the cheapest solution is also the best one” (Austrian interview #6, debt counsellor). Somewhat less often, the appreciation of money and the macro-economy, solidarity and distributional justice as well as attitudes and reflections about the role of the market and the government have also been mentioned.

1.5.2 Judgments of the importance of the financial literacy facets

The tendency of priorities outlined in the responses above can be found even more pronounced in the answers to the perceived importance of the different facets. When asking the interviewees for the “core” of financial literacy, from the total of 263 statements across all interview transcripts 189 (72 percent) can be assigned to the individual cognitive facet and were mentioned at least

once by 35 of the 40 interviewees (n = 35). 41 statements (15%, n = 17) are related to the systemic cognitive facet and only very few to the two non-cognitive ones (individual non-cognitive 8%, n = 11; and systemic non-cognitive 5%, n = 6). In relative terms, when it comes to the appreciation of the importance, non-cognitive and systemic facets are losing their significance.

Even within the individual cognitive facet a slight shift in importance can be identified. The topics "planning and managing financial matters" (n = 30) and "saving money / building assets" (n = 16) with 43 percent and 18 percent, respectively, are still represented prominently; however, "prevent (over-)indebtedness" is given more importance to than to the other two topic areas. "Over-indebtedness" is defined as the consequence of the "wrong" handling of own money leading into a debt cycle. About 12 percent of the statements of the participants can be assigned to this topic (n = 15). The distinct importance of the debt issue can be substantiated by the fact that the two areas of competence "drawing up a budget" (n = 19) and "planning expenses in accordance with own needs and possibilities" (n = 13) have gained dominance and amount to 29 percent of the total number of the individual-cognitive statements. The area of competence "using banking and financial services for daily needs" is, however, not of the same significance anymore.

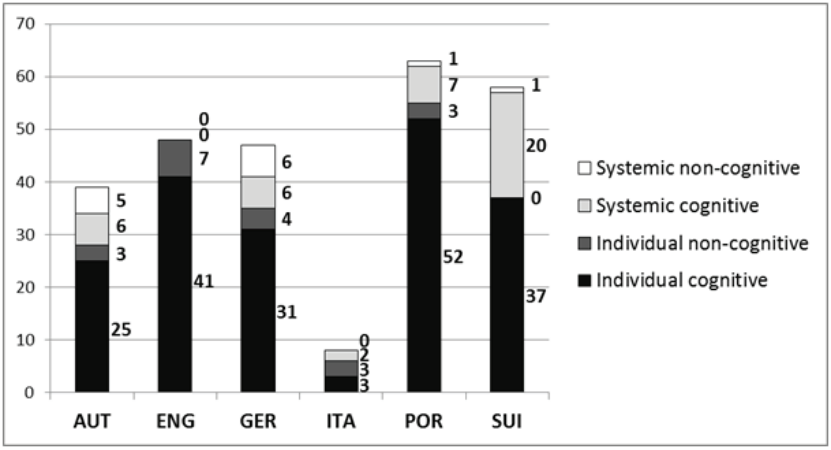
Concerning the systemic cognitive facet, the topics "contexts of monetary and financial policy" (n = 8) and "economic contexts/relationships in general" (n = 7) are quite dominant with 33 percent and 23 percent respectively, followed by the topics "social security system" (n = 3), "contexts of real economy" (n = 2) and "tax system" (n = 5) with shares from 8 to 18 percent. Of no importance is "knowledge about financial facts" (0%, n = 0). It is striking that in the context of the systemic cognitive facet the interviewees mainly focus on pragmatic aspects that are considered to be relevant for everyday life such as interest rates, inflation or taxes. The following two interview excerpts illustrate this observation quite well: "Particularly important is the knowledge of taxes and charges, how these come about, what is funded with taxes and what the consequences are for me" (German interview #2, company trainer) and "[t]he fact that money can lose its value, which is something they know partly, but not all of them. And they especially do not know what the implications of depreciation are for them. Inflation and deflation effects on interest rates and such" (Swiss interview #4, VET teacher). In-depth, critical or reflective statements concerning the economic and societal overall context (e.g. financial crisis) occur sporadically and more rarely than in the previous question about the perceived facets of financial literacy.

1.5.3 Comparison between countries and respondent groups

Finally, similarities and differences can be determined concerning the appraisal of the importance of the facets of financial literacy between countries and respondent groups, although these comparisons must be interpreted extremely cautiously because of the small sample size and further methodical limitations (see below section 6).

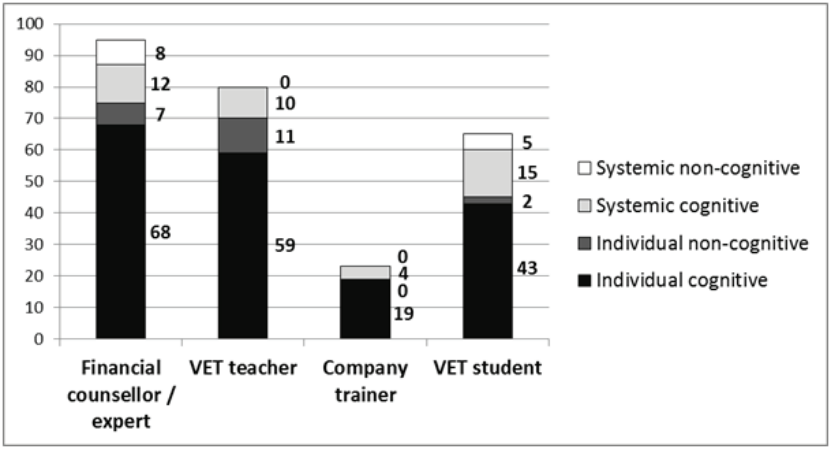
With regard to differences between countries (cf. Figure 1), mainly three tendencies are obvious. Firstly, a rather unequal distribution of references across the four facets of financial literacy can be determined. Individual cognitive statements dominate in all countries, whereas this phenomenon is especially pronounced in England and Portugal, where more than 80 percent of the responses can be assigned to this facet. Also, within the individual cognitive facet, an unequal distribution can be noticed. For the 36 overall references in the competence area of "drawing up a budget", 18 were recalled by Portuguese interviewees and 10, by English participants, indicating an especially high relevance attributed to this competence area as a core aspect of financial literacy. Secondly, systemic cognitive aspects are considered to be relatively important for the Swiss interviewees (20 out of 58 references in total) compared to participants from other countries. In England for example, no systemic aspect, neither cognitive nor non-cognitive, was recalled at all. Thirdly, both individual and systemic non-cognitive aspects are much more present in the references of Austrian (8 out of 39 references in total) and German interviewees (10 out of 47) as illustrated by the diagram below.

Figure 1: Country comparison of the perceived importance regarding the facets of financial literacy



Comparing the responses between respondent groups, it appears that neither VET teachers nor company trainers mentioned systemic non-cognitive aspects when it comes to the core of financial literacy (cf. Figure 2). In contrast, financial counsellors/experts and VET students mention these aspects. It is interesting to highlight that all five references in the group of VET students can be traced back to one single female student. Similarly, four out of eight references in the group of financial counsellors/experts can be traced back to the same person working as a debt counsellor. Thus, only a very low number (six in total) of interviewed individuals throughout the respondent groups conceived systemic non-cognitive aspects as a core part of financial literacy. On the contrary, systemic cognitive references constitute almost a fourth of all the references in the VET students group, which is the highest relative ratio of all the respondent groups, whereas VET teachers, for instance, seem to be quite cautious in this regard. When asked to give reasons for their judgements, they justify them by the fact that they do not want to overwhelm the students with topics they are not able to understand. The content of the references concerning the individual cognitive facet does not differ essentially between the different respondent groups.

Figure 2: Respondent group comparison regarding the perceived importance of the facets of financial literacy



1.6 Conclusions and Outlook

Based on a broad and theoretically substantiated framework of financial literacy (cf. in detail Aprea 2014; Wuttke & Aprea 2014) an interview study was presented in this paper, with which relevant topic areas in particular for the individual cognitive and the systemic cognitive facet of financial literacy could be specified and solidified, initially. However, the results of the study show that a broad view of financial literacy appears to be present only for a few of the interviewees. The people interviewed for this study evaluate the facets of the theory-based framework differently and emphasize mainly the aspects that are included in more restricted models such as the PISA Financial Literacy Framework (cf. OECD 2012). Systemic competence components and non-cognitive aspects of financial literacy are perceived to a lesser extent or considered as less relevant. This result, which is confirmed and reinforced by more comprehensive quantitative surveys (e.g. Aprea et al. 2014), is surprising, insofar, as findings on attitudes and delay of gratification – though not generated in the context of financial literacy – show how important these facets are (Forstmeier et al. 2011; Holodynski & Oerter 2002; Meier-Magistretti et al. 2013; Mischel et al. 1989; Mischel 2015). The same applies with regards to the systemic component. As illustrated by a recent UNICEF report (2014), systemic finance issues have a tremendous influence on everyday lives and future perspectives of our target group (i.e. adolescents and young adults) even in rich countries, and, therefore, should not be missed by an educationally sound conceptualisation of financial literacy. Given these considerations, it might be presumed that both, the interviewed stakeholders as well as the narrow conceptualisations of financial literacy seem to be characterized by systematic "blind spots", and thus, much more effort in changing the public opinion might be required. In addition, the comparative results also give rise to the assumption that the awareness of the need for a broader conceptualisation of financial literacy might differ among different groups of stakeholders and countries. However, we are aware of the exploratory nature of our research, and of the fact that additional theoretical and empirical enquiries are needed in order to sustain our framework as well as our conclusions.

With regard to a theoretical elaboration of the framework, especially the following two aspects seem to be essential: On the one hand, the boundaries between a comprehensive vision of financial literacy, as promoted by our framework, and the broader concept of economic competence should be clarified. On the other hand, the relationships among the four facets of financial literacy need to be further explained and defined.

Future empirical studies should particularly consider more systematic sampling procedures, such as maximum variation sampling (cf. Kleining &

Witt 2001). Moreover, future studies should try to rule out possible biases caused by translation and interpretation problems in various stages of the study. For example, even by providing a template of our framework, it cannot be entirely excluded that interviewees and coders might not have a shared understanding, especially in relation to the terms "individual" and "systemic". Furthermore, though the same group of interviewers conducted the interviews in their respective countries, the existence of interviewer variability between countries is also a possible source of unintended subjectivity. To overcome this problem (especially in an interdisciplinary, international and multilingual research team) intensive interviewer and coder trainings are required.

In addition to these considerations, the development and validation of diagnostic instruments for the acquisition of the various facets of the financial literacy framework is planned for the near future. Their significance can then be examined using appropriate external criteria.

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2 Secondary School Students' Understanding of the Financial System

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2.1 Introduction

Financial literacy has been generally portrayed as a matter of personal responsibility (e.g., Kempson 2009; Lusardi et al. 2010; Atkinson and Messy 2012). This standpoint excludes understanding of public money management and the behaviour of the financial sector. One problem with this neglect is that it gives the impression that financial probity is the exclusive responsibility of the individual. A second problem is that it implies that public money management and the conduct of the financial sector are matters for the exclusive attention of specially trained experts in government and finance. Given the ways in which money management by governments and banks frames the opportunities for individuals (e.g., Farrow 2002; Levin 2012; Nicoll 2012), this stance impoverishes the role of democracy in social self-determination. In this context, we may ask whether schools could play a role in developing informed citizens who are capable of providing a sufficiently knowledgeable and critical electorate to encourage democratic governments to pursue policies towards the financial system which benefit their citizens.

This is an ambitious objective for schooling. In the first instance, it requires good understanding of the ways in which students understand the financial system. Although there is some limited evidence of younger childrens' understanding of money and banking (e.g., Gunter & Furnham 1998), there is comparatively little or no evidence of students' understanding of bank and government behaviour in the broader context of financial systems. This qualitative study addresses this gap by exploring young people's conceptions of the financial system. It aims to provide a basis for the development of definitions of financial literacy which are not restricted to individual responsibility.

Financial literacy is regarded as an important element of education policy in many countries and its profile has risen in the wake of the financial crisis of 2008 (Pahl 1999; Appleyard & Rowlingson 2012; Schleicher 2013). Policy measures (such as the increase in undergraduate tuition fees in the UK) which transfer financial risk from governments to individuals have reinforced calls (e.g. Joo & Garble 2004; Lusardi 2008; Wolfe-Hayes 2010) for

education to equip young people for the final tasks and responsibilities which lie ahead. However, definitions of financial literacy have, by and large, neglected students' understanding of the financial system. They are expected to plan effectively for future saving and borrowing based on a thorough understanding of interest rates and inflation. But how is this possible without some capacity to predict the future of the financial system which shapes their opportunities? The metaphor of 'good housekeeping' has long been used (e.g. Blanchard et al. 1990; Hutton 1991) to depict the conditions for the management of government debt. A commitment to 'good housekeeping' (Cameron 2008) has been prominent in the public justification of the approach to economic management adopted by the current UK government. But how can citizens understand the financial context in which their governments operate unless they are aware of implications of the differences between household debt and government debt? These considerations have been absent from programmes for financial literacy across the globe. Whilst there has been a growing critique of the restriction of financial literacy to private responsibility (Williams 2007; Willis 2008; Pinto 2013; Davies 2015), the evidence base for developing an 'active citizenship' approach (Davies 2006) to financial literacy is very sparse. The objective of this paper is to address that gap through an exploratory study of the conceptions of secondary school students in England.

The remainder of the paper is divided into four sections. First, we consider different definitions and measurements of financial literacy. We use this section to place our research within the context of the large body of previous work in the field of financial literacy. This is followed by an account of our method, evidence from in-depth interviews and a discussion of implications for research, policy and practice.

2.2 Financial Literacy: Definitions and Evidence

We have identified three different approaches to the definition of financial literacy: (i) Knowledge and attitudes which underpin financially literate behaviour in the context of personal money management; (ii) Critical financial consumption (which extends (i) to also include an ability to discriminate effectively between better or worse financial deals and better or worse financial providers; (iiii) Active citizens in a financial context (which extend (ii) to include an informed stance towards the role of democratic governments and the financial sector. We summarise these three approaches in Table 1. This summary identifies the distinctive emphasis in each approach rather than attempting to convey the full range in each approach. In the remainder of this

section, we outline each approach and review the evidence each approach has generated.

Table 1: Summary of Approaches to Financial Literacy

	Distinctive emphasis in each approach		
	Aim of financial education	Knowledge, skills, attitudes to be promoted	Example sources
Personal Money Management	Responsible financial behaviours by consumers	Knowledge of budgeting and financial risk management and a willingness to defer gratification (Future-mindedness).	Furnham (1999); Huston (2010); Walstad et al. (2010); Lusardi (2008)
Critical Financial Consumption	Critical consumer behaviour to encourage efficient financial markets	Knowledge of the range of available financial products and capacity to identify which financial products will be good for them.	Atkinson et al. (2007); Rutledge (2010); Mundy (2011)
Active Citizenship	Citizens' capacity to help shape the financial context for society	Understanding of implications for society of public money management.	Mishkin (2008); Davies (2015)

Financial literacy is most frequently (e.g. OfSTED 2008; Redmund 2010; Xu & Zia 2012) defined in terms of 'personal money and asset management'. This literature regards financial behaviour as a product of the combination of knowledge and attitudes. One strand in the literature emphasises financial knowledge. For example, Lusardi (2008) divides financial literacy into two types, basic and advanced. The former involves knowledge of fundamental financial concepts such as interest rates, inflation and concept of risk diversification whereas the latter involves decision making skills and understanding of the relationship between risk and return, differentiation between bonds, stocks and mutual funds and basic asset pricing. A similar approach is taken by a council established to advise the US president (PACFL 2008: Recommendation 11) which defined financial literacy as "the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being." Similarly, in her review of 52 studies data sets, Huston (2010: 303) identifies four content areas: (i) Money basics (including

time value of money, purchasing power, personal financial accounting concepts); (ii) borrowing (i.e., bringing future resources into the present through the use of credit cards, consumer loans or mortgages); (iii) investing (i.e., saving present resources for future use through the use of saving accounts, stocks, bonds or mutual funds); and (iv) protecting resources (either through insurance products or other risk management techniques). The importance of the distinction in this classification between short and long-term financial planning is suggested by a report from the New Zealand Commission for Financial Literacy and Retirement Income (2012). This report found that formal financial education programmes being delivered focused mainly on goal setting, budgeting and managing income, debt and expenditure. A major gap was seen in the delivery of financial programmes that focused specifically on savings, investments and protecting assets and the influence of local, national and global finances on personal and family finances.

In principle, it would be possible to check whether the data support the division of financial knowledge into the sub-groups suggested by Huston (2010) and others (e.g., Altintas 2011). However, usual practice has been to rely on a priori categories of financial knowledge. There have been numerous attempts to develop instruments to measure this construct. Lusardi and Mitchell (2011: 498), acknowledging the difficulty in measuring people's way of processing economic information to make informed financial decisions, argue that financial literacy measures require simplicity, brevity, relevancy to concepts pertinent to people's day to day life, and be able to differentiate between various financial knowledge levels. On the basis of these four principles they designed three multiple choice questions to measure individuals' understanding of fundamental financial concepts of compound interest, inflation rate and risk diversification. While the first two questions required numeracy skills, the last question required an understanding of the stock market. On the other hand, Knoll and Houts (2012) used Item Response Theory (IRT) to develop a reliable and systematic psychometric test of financial knowledge. Their test items (Houts 2012: 399–400) capture knowledge of: annuities, debt management, diversification of risk, housing, inflation, interest rates, investing, life insurance, retirement savings, and time value of money. Test items take the form of multiple choice or 'true/false' questions.. These and other studies (e.g., Danes & Haberman 2007; Walstad et al. 2010; Altintas 2011) also take for granted an 'information processing' approach to the outcomes of learning. Debate within this literature focuses on the characteristics of a good test item. The task of these measurement instruments is to capture (i) elements of knowledge; (ii) elements of the application of knowledge; (iii) distinct attitudes and (iv) particular behaviours.

Researchers using surveys in the US, UK and Australia have generally concluded that young people have low levels of financial literacy. Lusardi et al. (2010: 376), in their the National Longitudinal Survey of Youth

in 2007–2008 in USA, found that financial literacy amongst young people in United States was overall low, particularly around interest rates, inflation and risk diversification. Similarly, Australian university students showed low level of skills and knowledge in financial matters (Beal & Delpachitra 2003). Out of five identified areas such as basic financial knowledge, markets and instruments, planning, analysis and decisions, and insurance; decision making skills and insurance knowledge appears to be least developed. In a similar vein, a large-scale study commissioned by the Royal Bank of Scotland (2011) found that, on average, young people were seriously over-optimistic about their financial futures.

A number of studies have investigated relationships between financial knowledge, background characteristics and behaviours. Beal and Delpachitra (2003) reported that financial literacy amongst university students in Australia was positively associated with work experience and personal income. Knoll and Houtts (2012) found a strong association between scores on their test and respondents' level of education. After controlling for income they found that financial knowledge was a significant predictor of having a savings account. The overall score on their test items predicts retirement planning better than the items used by Lusardi and Mitchell (2007). Evidence from a small scale study (Appleyard & Rowlingson 2012) interviewing 7–11 year-old students has suggested that financial knowledge is positively related to socio-economic background.

A second strand within the 'personal money and asset management' literature emphasises financial attitudes and self-actualisation. Financial attitudes (e.g., Furnham 1984; Xiao et al. 1995; Hayhoe et al. 1999) are generally measured through Likert scales. Furnham (1999) conducted a survey of 250 British 11–16 year olds to examine their spending and saving behaviour. A 20 item attitudinal scale was used to measure childrens' attitude towards spending and saving. A VARIMAX rotated factor analysis on the 20 item scale (Furnham 1999: 689) suggested five factors: spending money, saving money, mechanics of banking, indifference to money, and work ethics values. Regressions on these factors suggested that saving attitudes of children were not related to their income but were related to the ways in which children used money i.e. how much they spent, lent or borrowed or saved. Shim et al.'s (2009) student financial well-being model places financial attitudes in the context of upbringing and emergent identity. Their model draws on four theories: lifespan development (Baltes 1987); the hierarchical model of personal, values, attitudes and behaviour (Homer & Kahle 1988); consumer socialisation (Moschis 1987); and planned behaviour (Ajzen 1991). Their empirical evidence supports a positive association between self-actualization values and financial attitudes which are in turn were related to financial behavioural intentions. Perry and Morris (2005) use the construct 'locus of control' rather than self-actualisation. Locus of control refers to the extent to

which an individual attributes their experience to their own actions as opposed to the environment in which they are located. Their study of roughly 11,500 adults in the US suggested that locus of control mediates the relationship between financial knowledge and behaviour: individuals are more likely to act upon what they know if their locus of control encourages them to believe that their actions shape their future. Bachan (2013) used an attitudinal survey to assess university students' attitude towards risk, debt aversion and uncertainty. This was a self-assessed survey where students were asked to select the value that best represented them on a 11 point risk scale ranging from 0 (not prepared to take risks) to 10 (fully prepared to take risks). Bachan also used a 5 point Likert scale to measure students' level of debt aversion and dislike of uncertainty. Level of expected debt was associated with gender, ethnicity and anticipated earnings after university education. Non-white students (British Asians, blacks and Chinese) expected to have less debt than whites. Male students had a greater expected level of debt than females. Females were found to be relatively less willing to take risks and more debt averse than males. Students with part-time work had a lowered level of expected debt.

Both these strands take for granted the restriction of financial literacy to personal money and asset management. The measures used focus predominantly on the increase of financial knowledge and its implications on short-term financial decision making/planning.

Some definitions (e.g., Rutledge 2010; Mundy 2011; Australian Securities and Investment Commission 2011; PfEG 2012) expand the role of 'personal money management' to the notion of a 'critical financial consumers' who can provide an effective context for the development of efficient financial services, notwithstanding a need for financial regulation. These definitions go beyond statements (e.g., DCSF 2008: 4) about 'critical consumers' which do no more than restate the *caveat emptor* dictum. The most rigorous attempt to measure this construction of financial literacy has been by Atkinson et al. (2007) who, on the basis of factor analysis of interviews with over 5,000 adults, define financial capability in terms of four behaviours: managing money, planning ahead, choosing products and staying informed. They infer that the greatest cause concern from their evidence lies in adults' weak capacity to distinguish between good and bad financial products, concluding (Atkinson et al. 2007: 34) that 'with levels of financial capability as low as those identified by the survey, it is easy to see how the past mis-selling in the UK occurred'. They used cluster analysis to relate self-declared financial behaviours to respondents' background characteristics. They found that younger adults and respondents with lower incomes were more likely to have low levels of financial capability. This contrasts with Furnham's (1999) evidence suggesting that income made no significant difference to the money management of younger schoolchildren. This difference may reflect the difference in the age groups sampled in these

two studies (suggesting an interaction between age and income). Alternatively it could be that school students' patterns of behaviour with low levels of income and financial responsibility are very different from relations between adults' financial literacy and behaviour.

A third approach to financial literacy begins with the critique (Williams 2007, Willis 2008, Pinto 2013) of the ambitions for financial education which is limited to a consumerist model. In Pinto's words (2013: 113):

> "An examination of any form of literacy—including financial literacy—requires consideration of how it operates within the social contexts and how the social contexts influence (and are influenced by) individuals' understandings. Without attention to such issues, financial literacy education is reduced to replicating inequities and contributes to the continued marginalization of already vulnerable populations, contrary to the outcomes identified in the dominant narratives."

This approach emphasises the importance of financial regulation and the role of individuals as citizens in shaping the context for regulation in democratic societies (Mishkin 2008; Davies 2015). Moreover, it is suggested that the role of citizens is critical for creating the context for government's financial behaviour. If political parties believe that the median voter is ignorant about public money management they face a big incentive to offer policies which are rich in short-term political gain even if they know that these policy stances are problematic for the future of the country. This makes democracy becomes dysfunctional. The standpoint we are adopting is that voters should have sufficient understanding of the economic and financial system to enable them to make reasonable connections between government spending, taxation, debt, inflation and incomes (Davies 2006). However, researchers have yet to provide much in the way of empirical evidence on this approach to financial literacy. This study aims to address this knowledge gap by providing some evidence of the ways in which young people understand money management by governments and banks. We regard this kind of evidence as a necessary precursor to the development of teaching strategies designed to improve students' understanding. Using a framework for financial literacy proposed by Davies (2015), our research questions examine students' conceptions as expressed through their basis for making judgements about financial decisions by individuals, governments and banks. Conceptual development in social science, in contrast to physical science is more often located in the sophistication of reasoning about what *should* happen or about what is 'best' (Davies & Lundholm 2012; Lundholm & Davies 2013).

R1: What conceptions do young people hold about debt, risk, interest payments and time preference?

R2: To what extent are these conceptions consistent across the contexts of the individual, governments and banks?

2.3 Method

In contrast to the evidence base on students' knowledge in the field of personal money management, the evidence base on school students' understanding of the financial system is small (Lundholm & Davies 2013). Our research is, therefore, necessarily exploratory and we concluded that semi-structured interviews offered a better chance of providing insights into students (mis-)conceptions than open or closed written questions. Using the content analysis and framework developed by Davies (2015) we devised a broad guide for in-depth interviews with secondary school students. We devised a set of problems which positioned debt, interest payments, debt and time preference in different contexts (individual, government and banks) (see Appendix 1).

The interviews (lasting an average of twenty minutes) were conducted using standard protocols of following up students' utterances with prompts (e.g. 'Could you explain that a bit more?' 'Could you tell me why you think that is the case?') for clarification. In addition, where interviewees used a bipolar category for description (e.g. 'that's a negative thing' or 'long-term effects') interviewers asked about the converse (what would be 'a positive thing' or a 'short-term effect') and asked students about relationships between statements they had just made and statements they had made earlier.

Since our objective was to identify categorically different conceptions, our sample was designed to make it likely that we would include students with different value judgements and different conceptions. To that end we recruited students from four different secondary schools serving localities which varied by social class and ethnicity. In each school, we asked each school to suggest five interviewees with a mix by gender and ethnicity, as well as a wide range of academic achievement. The conceptual differences we found did recur in successive interviews conducted in different schools and after completing interviews in the fourth school we concluded (on the basis of the 'saturation' principle (Glaser & Strauss 1967)), that there was not a strong case for extending the sample. It is, of course, possible that if we had recruited a larger sample or if we had used a greater range of financial problems posed in different formats, we might have found other categories of conception. The research received approval from the University of Birmingham ethics committee. Schools, parents and students were given a briefing about the research. Consent was obtained from school headteachers, parents and students. Data were stored securely and anonymously.

However, the interviews were digitally recorded and transcribed. In our analysis, we aimed to identify the way in which students understood each problem and the basis for their reasoning about each problem. We coded the transcripts with descriptive labels for distinct conceptions of each problem,

and then analysed whether students were using similar ways of thinking about the problems when they were set in different contexts. The coding was undertaken separately by two researchers and the results compared by the team. Discussion between the researchers yielded an agreed coding which we have used to present our results.

2.4 Results

(i) Beliefs about the conditionality of value judgements concerning time preference and debt

We begin this section with students' responses to a question: "If you had to choose between £100 now and £130 in three years' time, which would you prefer?". Each interviewee opted for the £100 now. When asked why, some said simply that they would prefer the money now. The two most frequently offered justifications were (i) that inflation would reduce the (real value) of money received in the future and (ii) that the £30 difference was not a sufficient absolute sum to make it worth waiting for the money. However, not one of the students who offered the argument about inflation was able to give a numerical justification of their choice. When students were asked if they would prefer £10,000 now or £13,000 in three year's time, they tended to prefer £13,000 in three year's time. That is, they did not display consistent time preference. Their preference depended on the absolute level of difference rather than the percentage difference in line with other studies reported by Frederick et al. (2002).

We turn now to students' reasoning about the circumstances in which debt should be considered a good or a bad thing. Students were initially asked "Imagine someone aged 22 with a debt of £20,000. Is this a good or a bad thing?" Most students offered no qualification to their judgement that it would be a bad thing. Roughly a quarter said "it depends". This was followed by a question "Can you imagine any circumstances in which it would be a good thing?" Roughly half of the students who had initially said that the debt was bad now suggested some conditions under which it might be good. Students referred to three conditions: starting a business, buying a house or going to university. The others stuck with their position that the debt was bad. However, towards the end of the interview students were specifically asked whether it made sense for an 18-year-old student to take on debt to go to university. Even those students who had previously said they could not imagine circumstances where a debt for a 22-year-old was good, now suggested that taking on a debt to go to university would make sense as long as it

helped them to get a good job. These answers suggest that a minority of these students had a quite strongly embedded general notion of debt which they used to judge whether taking on debt made sense in different circumstances. Other students had a notion of debt as something to avoid, with specific exemptions such buying a house or starting a business. The use of specific language such as 'mortgage') may encourage individuals to view these cases in a completely different way from the way in which they regard debt in general. If this is the case then an acceptance of university loans as normal (and desirable like mortgages) may mean that evidence of students' attitudes towards debt in general has little bearing on the way they approach decisions about whether to take on a loan for studying at university.

We were interested in whether students reasoned in the same way about household and government debt. In the opening question on this theme, students were asked to consider a government with a debt equivalent to half the amount of money it receives in tax each year. Only a couple of students thought this was unambiguously a bad thing. This contrasts with their initial responses on individual debt. Their caution in responding to this question was based on the ability of governments to raise taxes, belief in the benefits of government spending and uncertainty about their own knowledge. For example, in Figure 1 a student expresses uncertainty at the beginning and the end of the extract. They argue that the problem for government finances lies in the need to repay debts rather than the burden of interest payments.

Figure 1: Interview extract on government debt

I	Now can we think about a Government, a Government that has got a debt that amounts to half of the amount of money it gets in tax a year, would you see that as being a good thing or a bad thing?
S	Um, that's quite a hard question, um, probably a bad thing…
I	Right.
S	Because I suppose that could, in effect, determine what it spends money on in the country, so it'd reduce what it could spend.
I	Why, why would it have to reduce what it's spending?
S	If it's in debt, it's got to pay more off to pay the debts of the country, I don't know.
I	Okay.
S	That's just what I think really.
I	Yeah, so why would it have to pay it off?
S	I've no idea why they'd have to pay it off…

This tendency to locate a government debt problem in terms of repayments rather than interest payments was underpinned by students being unaware of the existence of a market for government debt (illustrated by the extract in Figure 2).

Figure 2: Interview Extract on the market for government debt

I	Would that (the government maintaining a constant level of debt) be a problem?
S	It would eventually be a problem.
I	Why would it eventually be a problem?
S	'Cause if you still have the debt and you used all your taxation money and then suddenly the people who own the debt want it Want their money And you can't pay it…
I	Okay, why would they want the money?
S	Well, say if they get into debt themselves- and they need the money to pay off their debt- and you didn't have the money to pay them, then they can't pay their debt and it'll mess up…

Moreover, when asked about the source for government borrowing, students suggested that governments borrowed exclusively from other countries. None of the students referred an interest rate effect on the implications of debt either for a government or for an individual. Some students argued that the wisdom of the debt depended on whether the government was spending the money on 'useful' things. A number of students distinguished between what they saw as 'useful spending' (e.g. on getting people into work and spending on education) and spending that was 'not useful' (e.g. welfare benefits). This point was followed up by asking students whether a government should cut spending by not building new schools (the incoming conservative government in the UK announced in 2010 that, as part of its drive to reduce government debt, it was abandoning the previous government's 'Building the Schools for the Future' programme). One student (Figure 3) referred to possible multiplier effects of government spending, but regarded these as very small. Consequently, this student did not regard multiplier effects as a justification for adding to government debt in the short-term.

Figure 3: Interview extract on government spending

I	What about if a Government is deciding whether or not to cut spending by stopping building 500 schools, how would they work out whether to cut that spending or not?
S	I think they'd have to look at all these sort of statistics they, they, they seem to have about, err… [pauses]... it's like the, it's like how much GDP they'd get maybe in the long term off these pupils which go through these schools and whether it's worth spending the initial money in, on building the schools themselves.
I	Okay, so they'd just look at the long term effects through what would happen to the students who went to the schools?
S	I think so, yeah.
I	What about short term effects?
S	It's the money they'd, it's just the general, um, just the cost of actually building the schools themselves, I think, so...
I	And so the cost of building the schools, is that a, a good thing or a bad thing?
S	That's, that's, I think that's a negative really.
I	Why is it a negative thing?
S	'Cause it's more increasing on the debt, isn't it, if they're having to borrow maybe just to build these schools, then it's just one of these things which adds to the debt.
I	Okay and anything positive about that…[pauses]... about the building of the schools in the short term?
S	Well, yeah, I, I'm sure it would sort of bring builders in or, maybe to the area and then it would increase the, so if there's any shop, shops around, they'd get a small increase in the customers and, and the Government would receive tax and all that sort of stuff.
I	So would it be a good thing or a bad thing?
S	That, that, that's a good thing. But on the whole, I'd say it's a bad thing, the cost of having to…
I	Right, why on the whole would it be a bad thing?
S	Because the, because I think the, the tax they'd get through maybe more customers in the local shops would be tiny, compared to the actual general cost of building the schools and funding all these wages.
I	Why, why is that?
S	Because, I'm not sure really.

(ii) Beliefs about the cost of borrowing for individuals and governments

Students were asked what might affect the interest that a person would have to pay if they borrowed £500. All but two of the students suggested one or more of a number of possibilities why someone might pay more interest: being a riskier borrower, borrowing over a longer term, the local or national economy being in a weaker state. Most students suggested just one reason although they were prompted to offer more reasons. There was no obvious pattern of difference between students who offered only one reason and those who offered several reasons. Students were then asked what might affect the interest that a government would pay on its debt. Fewer than half of the students were able to offer any possible explanation. The most frequent suggestion was that governments with bigger debts would pay higher interest rates. A couple of students also suggested that governments considered to be a greater risk would be required to pay more interest. One implication of a belief that if you want to borrow more you will have to pay a higher rate of interest would be that governments pay higher rates than individuals (Figure 4).

Figure 4: Interview extract on the cost of government borrowing

I	Imagine a Government that wants to borrow £50 billion, what would affect the rate of interest that it would have to pay?
S	Um, they'd have to pay a lot because it's a lot of money.
I	Okay, so you'd have to pay more interest, the more you borrow?
S	Yeah.
I	So does that mean that Governments will tend to pay higher rates of interest than individual people?
S	Yeah, probably.

However, it is far from certain that the student reported in Figure 5 was distinguishing clearly between interest rates and the total amount of interest payable, so this inference must be very tentative. What we can see is that the range of explanations for paying higher rates of interest was similar in the cases of individuals and governments. Nonetheless, our evidence did not encourage a view that students were consistent in the way in which they explained the cost of borrowing for individuals and governments.

(iii) Value judgements about the market freedom which banks should enjoy and the consequences of a bank going bankrupt

Students were asked whether banks should be allowed to charge whatever rate of interest they choose. Only two students argued that banks should have freedom to set interest rates on the grounds that "it was their money". Two other students argued that there was no need to control interest rates because market pressures would ensure that banks would charge very similar rates of interest. However, a majority of students believed that banks should not be allowed this freedom. The interview extract in Figure 5 was fairly typical. This student mainatined a belief that variation in interest rates for different individuals was unfair even when challenged with what they had said earlier.

Figure 5: Interview extract on banks' freedom to set interest rates

I	So is there any need to step in to say that a bank shouldn't be allowed to charge a certain rate of interest, from what you said?
S	Well, it would be a lot better and a lot fairer if the bank charged the same interest each time for everybody, then…
I	Why would that be fairer?
S	Well, it, um, will make everybody equal, there wouldn't be any complaints from anyone, err… [pauses]... I'm not too sure, I just know. That's what I think.
I	Even, so, so, 'cause earlier, you said that a bank would charge a higher rate of interest if it thought somebody was less reliable…
S	Mm-hmm.
I	So you're saying now that that's not fair?
S	I'm not really sure. I guess the interest, it depends on the person, but also it shouldn't really vary too much, 'cause otherwise it's just being unfair.
I	And, and why is it unfair to charge a higher rate of interest to someone you think is less likely to pay it back?
S	Well, then they'd have a lot, ha, a lot more trouble paying it back than the person who probably can pay it back…

We asked students whether they had ever heard of a bank going bankrupt. Three students said they had, but could remember no details. Other students were either unsure or said they had not heard of a bank going bankrupt. Most students thought a bank could go bankrupt if people "stopped using the bank" or if "borrowers did not repay loans". Most students believed that banks going bankrupt would cause problems for either or both employees and cus-

tomers. None of the students referred to the government protection offered for savers in the UK whose bank became insolvent. A couple of students believed that bankruptcy would create a problem for other banks because it might reduce savers' confidence in their solvency. None of the students referred to inter-bank loans, encouraging the inference that students were unaware that banks borrowed from each other. None of the students suggested that bank insolvency might create problems for economic activity in the country.

2.5 Conclusions

We have presented results from small-scale exploratory research. Necessarily, our interpretations should be viewed as tentative, offering signposts to further research. Other researchers interviewing other students might uncover ways of thinking that we have not observed. Different problems might elicit a different range of responses. In our conclusions, we consider some questions for further research, practice and policy.

Researchers (e.g., Bachan 2013) are interested in students' financial literacy in the context of particular policies such as student finance as well as in the broader context of financial education. It has been customary in previous research to use constructs such as 'attitudes to debt' and 'understanding of inflation' as if these were generalised conceptions which are independent of context. This assumption of generalizability is critical to the measurement scales which have typically been used in the literature on financial education and student finance. The interview evidence reported in this study is not consistent with this assumption. The more common situation in our data was that students expressed different conceptions about the desirability of debt in different contexts: in terms of variation in individual circumstances and a difference between individual debt and government debt (notwithstanding the political rhetoric about government debt being similar to household debt). For most of the students in our sample, time preference was contingent on the absolute size of the sums of money involved. So whilst a question about a particular context may be a useful way of identifying variation between students, it may not be a sufficient basis on which to comment on general attitudes to debt or time preference.

Nonetheless, we did find some evidence of consistency in conceptions between contexts: students expressed similar views about the cost of borrowing for individuals and the cost of borrowing for governments. The problem here is that students seemed unaware of the greater security that governments offered to lenders and the implications of this security for interest rates. This contrasted with the frequency with which students suggested that banks

would only lend to individuals who posed a higher risk if they were compensated by a higher rate of interest. Students' conceptions about the financial system may be more appropriately viewed in terms of 'knowledge-in-pieces' (DiSessa et al. 2004) than in terms of a coherent framework. Given that students only have direct experience of personal money management rather than the financial world, which creates the context for personal behavior, this may be not altogether surprising. We encourage further research to explore these questions.

If students' thinking about the financial system is fragmented, this carries important implications for financial literacy. We return to the interview extract in Figure 4 to exemplify this point. The economic policies of European governments in recent years have been heavily influenced by efforts to reduce the proportion of government spending devoted to paying interest on national debt. Retention of a 'Triple A' rating in international money markets was a key public commitment of the UK government and played a central part in the government's justification to the electorate of why it needed to pursue an 'austerity' policy (Osborne 2010). Citizens who believe that the cost of borrowing is positively associated with how much you borrow are more likely than citizens who believe that the cost of borrowing depends on the real rate of interest to have supported UK government policy over the past few years. It may be that the extract in Figure 4 reflects the student's uncertainty about whether they were being asked about interest rates or total levels of interest payable and this is a point for future research. More generally, the categorical differences between conceptions we have identified merit further investigation to see the extent to which students' understanding of the financial world is fragmented – and how this fragmentation is related to student achievement and characteristics.

The evidence we present is relevant to practice in assessment design, curriculum planning and interventions in financial education. A 'conceptual change' approach to each of these tasks demands some knowledge of students' preconceptions. They also demand some notion of a desirable and achievable level of conception of an individual phenomenon, coherence in conceptions across contexts, and framework coherence across conceptions of related phenomena. In particular we provide evidence of students' conceptions of time preference, individual and government debt, the cost of borrowing, reasons for and consequences of bank bankruptcies. Each of these pieces of evidence is relevant to the development of practice in financial education.

Finally, one possible riposte to critics of existing financial education programmes is that it is all very well to criticise any educational effort, but what would you do instead? It might be argued that it is unrealistic to even consider trying to education what the average 15–16 year-old thinks about the financial system. Why not leave the financial system to the experts? We

see two problems with this stance. First, the average 15–16 year-old will soon be expected to take their place as the median voter, who will be directly addressed by politicians seeking a mandate for their financial policies. Do citizens not have a right to expect their education to provide them with some help when they carry out this role? Second, citizens do create a context for the financial decisions of governments as well as banks: when they misunderstand, when they riot on the streets and when they occupy prominent locations. Our study begins the task of establishing an evidence base for a broad definition of financial literacy for active citizenship. Given international expectations for financial education in schools and the persistent tensions for democratic processes in turbulent, global, financial markets, this is an important task.

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Appendix 1: Framework for Interview Questions

	Underlying Questions	Questions for Students		
		Individual	Govt	Bank behaviour
Judging affordability (relationship between income, spending and wealth)	When is debt good and when is it bad?	A 22 year-old has a debt of £20,000. Is this a good thing or a bad thing?	A government has a debt amounting to half of the total income of the country. Is this a good thing or a bad thing?	Can a bank go bust? If so why?
Judging affordability (Interest payments)	How can you affect the interest you pay when you borrow?	An individual wants to borrow £500 – what will affect the rate of interest they will be charged?	A government wants to borrow £5billion. What will affect the rate of interest they will be charged?	Should banks be allowed to charge whatever interest they want to whoever they want?
Risk prediction and management	How should we work out what risk exposure is best?	An 18 year-old is trying to decide whether to go to university, How should they work out whether it is best for them to go?	A government is deciding whether to scrap plans to build 500 new schools. How should it work out what to do?	Should banks be allowed to lend as much or as little as they want, to whoever they want?
Simple and compound interest, Myopia (time preference)	How much is the future worth compared to the present?	A sixteen year-old has a choice between £100 today and £130 in five years time. Which should they choose and why?	Is it best for a government to reduce its debt by cutting jobs in the public sector?	

3 Analysis of Banks' Online Information Regarding Mortgages as a Basis for Financially Literate Decision-Making in First-Time Homebuying[1]

Bärbel Fürstenau, Mandy Hommel, Claudia Leopold, Héctor Ponce, and Mario López

3.1 Background and Aim

Financial decisions can strongly influence global economies and the well-being of societies and individuals. This observation holds especially true for decisions regarding complex financial products, such as liabilities. On the global level, the subprime crisis (beginning in 2007) has shown the effects of "ill-informed financial decisions" (OECD 2013: 140) concerning mortgages. On the individual level, instalment payments and total debt influence the potential amount of money that can be spent on daily expenses, larger future purchases, and holiday expenses. In the worst case, individuals face indebtedness or personal bankruptcy. To avoid serious negative consequences, financial decisions should be based on financial literacy. The relationship between literacy and decision-making was, for example, identified by Gerardi, Goette, and Meier (2010: 29), who obtained evidence of a correlation between low numeracy (as one aspect of financial literacy) and foreclosures.

In general, financial literacy can be understood as "… knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life" (OECD 2013: 144). For responsible decision-making, financial actors need to know concepts, procedures, effects, and risks related to complex financial products. They should not rely just on the recommendations of providers of financial products. In contrast, they should assess the plausibility of those recommendations because providers, e.g., banks, may ground their decisions on factors such as creditworthiness and assessment of securities

1 The project "Cognitive factors and design features that affect understanding of online information associated with financial products: the mortgage case" was funded by the German Research Foundation to support the initiation of international collaboration.

(like mortgages or land charges) and follow directives that may not in every case align with the best solution for the customer.
To acquire financial literacy with regard to specific products, individuals can consult the internet. A large amount of information about financial products is provided by banks online. However, banks differ remarkably in the quality and quantity of information provided on the internet. Without background knowledge, the customer might not fully understand the information that is presented.

The aim of our study is to analyse whether bank webpages have the potential to support informed and responsible decision-making in first-time homebuyers regarding mortgages. In addition, we aim to compare two industrial countries (Germany and the USA) and a less developed country (Chile), as the citizens of less developed countries have only limited access to online information. Besides, less information is available (Atkinson & Messy 2013). The USA is included because it represents an interesting reference country given its role in the recent subprime crisis.

3.2 Financial Literacy in the Context of Homebuying

Mortgages serve as a financial instrument for first-time homebuyers who either do not have enough equity to buy a house without debt capital or whose equity is tied up in long-term investments. The Federal Citizen Information Center (2014) regards decisions about mortgages as "… one of the most complex financial decisions you will ever make" (GSA 2014: 26). It therefore requires financial literacy. Financial literacy in the context of homebuying comprises knowledge and skills concerning planning and managing income and expenses, both short-term and long-term (OECD 2013). In addition, customers should "… understand the purposes of accessing credit and the ways in which expenditure can be smoothed over time through borrowing or saving" (OECD 2013: 148). Altogether, the decision-making process comprises the following core elements:

The *first* core element is the calculation of free monthly income (Grill & Perczynski 2011; Hammer 2014: 22 ff.; Hölting, Opoczynski, & Leutke 2012: 46 ff.). It consists of the knowledge and ability to control and monitor the individual budget, income and expenses. For that purpose, it is necessary to identify different types of income and expenses for living, spending, and saving (OECD 2013: 148). The result of this calculation process is the amount of monthly income available for instalments (CFPB 2014: 64).

The *second* core element refers to spending choices (OECD 2013: 148), in this case the choice between renting and buying. The customer has to determine which of the two options is associated with lower costs

(Keller 2013). A very simple way to do so is to contrast monthly net rent expenses and monthly expenses for a mortgage plus additional costs for utilities and maintenance. A more elaborate and, at the same time, more adequate way to do so is to take into account the long-term view, that is to say, the total period for the 'term of the loan'. In such a calculation, several assumptions concerning uncertain future developments have to be regarded, e.g., inflation, future interest rates for saving and borrowing, appreciation of the house, rent increases, and costs for maintenance. Independent of the computed result, and even if renting is more beneficial, the individual's wish to live in and own a house could prevail. In that case, he or she might disregard the result.

The *third* core element of the decision-making process aims at answering the following question: "how much house can I afford?" (e.g., Hölting, Opoczynski & Leutke 2012; Keller 2013: 20). Therefore, the financial framework for the project 'buying a house' has to be calculated (e.g., Hölting, Opoczynski & Leutke 2012: 56; Keller 2013: 19). The calculation of the affordable purchase price, which reflects the financial framework, is based on the individual's budget (income-expenses calculation), the individual's equity used to buy the house (down payment), and the amount of affordable mortgage. It is necessary and part of the decision-making process to understand the relationship between free monthly income and affordability.

The *fourth* core element is the actual calculation of the loan. Potential homebuyers compare various mortgage features, e.g., several terms of fixed interest, or different amounts of annuity depending on the term (e.g., Hölting, Opoczynski, & Leutke 2012: 74 ff.; Keller 2013: 61 ff.). The underlying calculation process is an annuity calculation.

Based on the four core elements mentioned above, a reference model representing all necessary information for supporting an informed decision-making was developed. Consistent with the core elements, the reference model comprises four reference calculators: income-expenses calculator, rent-vs.-buy calculator, affordable-purchase-price calculator, and loan calculator. Each of the four calculators has to be part of the reference model because they provide different, but likewise necessary, information for informed decision-making. The income-expenses calculator helps to estimate the free monthly income spendable for a mortgage. The rent-vs.-buy calculator helps to identify the lower-cost option. By using the calculator for the affordable purchase price, the potential first-time homebuyer learns the price of a house he or she can afford. Finally, the loan calculation informs the user about the annuity, the term of the loan, the interest, etc. and thereby allows to assess future financial constraints as consequences of the mortgage. Each calculator consists of concepts, i.e., input and output data, and explanations. The reference model was validated with three bank experts in the field of mortgages. It serves as a benchmark for information provided by banks.

Banks usually provide information regarding mortgages in the form of calculators on their webpages. We analysed the information given and compared it with the reference model. The results will allow us to obtain a general idea about the current state of information within and across countries and about similarities and differences vis-à-vis the target state, as expressed in the reference model. Starting from that position, we can cautiously assess the suitability of information banks provide for informed decision-making.

3.3 Method

3.3.1 Research question

Two questions guided the analysis:

1. What are the similarities and differences between banks' calculators? How do calculators differ within and across countries?
2. What are the similarities and differences between banks' calculators and the reference calculators?

The results will allow us both to obtain an overview of the information usually provided, the differences between the information provided, and the information necessary to make well-informed decisions.

3.3.2 Sample

The sample consists of the largest banks, according to balance sheets (total assets in 2012), of three countries—Germany, USA, and Chile. In general, the largest banks are expected to be also the ones that are best known, and their webpages are most likely to be consulted by potential homebuyers. In addition, by including the largest banks, we presume to cover a wide range of heterogeneity across quality and quantity of information given and thereby reach an accurate approximation of the variety of information. Originally, we planned to include the top ten banks of the three countries in the study. However, only banks that offer mortgages for private customers as well as calculators on their webpages could be included. Because in each country three of the top ten banks did not satisfy these criteria, the sample size was reduced to seven banks per country. Table 1 shows the sample of the 21 banks in total.

Table 1: Sample of banks

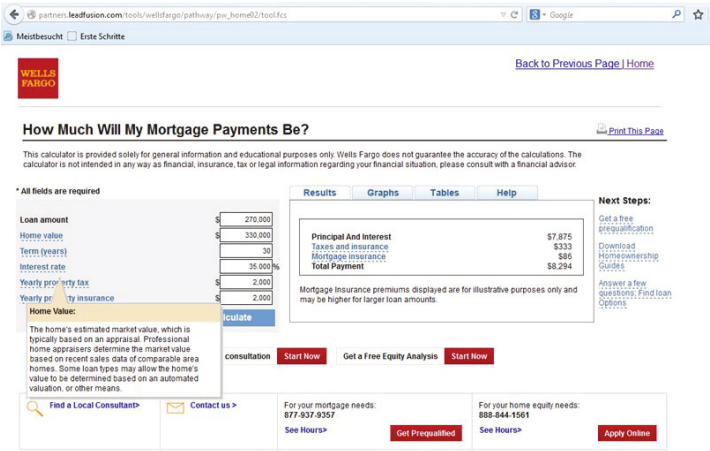
Rank	Germany, n=7	USA, n=7	Chile, n=7
1	Deutsche Bank AG	J. P. Morgan Chase & Comp.	Banco Santander Chile
2	Commerzbank AG	Bank of America Corp.	Banco de Chile
3	DZ Bank AG (Bausparkasse Schwäbisch Hall AG)	Citigroup Inc.	Banco del Estado
4	HypoVereinsbank – UniCredit Bank AG	Wells Fargo Corporation	Banco de Crédito e Inversiones BCI
5	LBBW Landesbank Baden-W.	U.S. Bankcorp	Banco Bilbao Vizcaya Argentaria BBVA
6	Norddeutsche Landesbank	HSBC North America Inc.	Scotiabank Chile
7	ING-DiBa AG	KeyBank	Banco BICE

3.3.3 Data analysis

Using a content analysis (Mayring 2010), the information referring to the calculators on the webpages of the banks was analysed. The calculators are usually structured in a way that the potential customer is requested to insert different data and press a calculation button before he or she receives the calculation result(s). In addition, in many cases, the customer can access explanations linked to the concepts or data by pressing a question mark ("?") or an information ("i") button. Figure 1 shows the loan-calculator of the U.S. bank "Wells Fargo". To calculate the annuity or the total payment for the mortgage, the customer has to insert data, such as the home value, the down payment, the term of the loan in years, or the interest rate. In addition, explanations are linked to the main concepts (Figure 1).

To compare the calculators of the various banks and countries, categorical content analyses were conducted for both concepts and explanations. For that purpose, concepts and explanations were aggregated according to their semantic similarity. For example, the English concept "Annual Percentage Rate" and the German concept "effektiver Jahreszins" were subsumed under the concept "Annual Percentage Rate". The English expressions "value of the property" and "value of the house" and the Chilean expression "valor propiedad" were coded as "home value", defined as the value of the house (including the land). Concerning explanations, the statements "[interest is the] cost for the use of a loan, usually expressed as a percentage of a loan" and "interest does not include fees charged for the loan" were judged as semantically similar and thus coded as "interest is the cost for borrowing money without additional costs".

Figure 1: Loan-calculator Wells Fargo.



Source: http://www.partners.leadfusion.com/tools/wellsfargo/pathway/pw_home02/tool.fcs (date: 2014-09-17)

For the coding of both concepts and explanations, we calculated an intercoder reliability using Cohen's Kappa. Two coders independently coded the calculators of one bank. As a result, we reached an accordance of .974 ($N = 293$, $p = .000$) concerning concepts and .712 ($N = 99$, $p = .000$) concerning explanations. In addition, we calculated an intracoder reliability based on one coder's recoding of all calculators of three banks (one from each country) after one month. As a result, we reached an accordance of .995 ($N = 631$, $p = .000$) with regard to concepts and .867 ($N = 54$, $p = .000$) regarding explanations. The fact that the intercoder reliability for the explanations is slightly lower than the one for concepts is due to the more interpretive process involved in coding explanations. Explanations on bank webpages are often expressed in complex sentences comprising more than one unit of meaning. Consequently, coders sometimes differ in the units of meanings they identify. Additionally, some explanations include re-commendations of the bank. Sometimes one coder coded the recommendation as additional explanation, while the other coder omitted the recommendation (e.g., the explanation for "term of fixed-interest" was complemented by the recommendation "debtors should calculate with 10-year term of fixed interest"). However, all in all the coding results can be judged as good or at least satisfactory (Greve & Wentura 1997: 111).

Subsequent to the content analysis, the degree of correspondence between calculators could be quantified based on the Galanter metric as relative distance

measure (Oldenbürger 1986; Fürstenau & Trojahner 2005). The possible values of the Galanter metric range from '0' to '1' where '0' indicates total correspondence and '1' indicates total dissimilarity between any two calculators. Based on this distance measure, beyond the pairwise comparison of calculators, the calculator that has the lowest dissimilarity with all other calculators can be identified. For that purpose, the mean is calculated for each data row in the matrix. The row with the smallest mean suggests the calculator with the lowest dissimilarity with all other calculators. This calculator can be taken as a representative calculator for a group of heterogeneous calculators. Therefore, we call this calculator the prototypical calculator. Based on this procedure, we identified four prototypes (income-expenses, rent-vs.-buy, affordable-purchase-price, and loan) for every country and the bank providing the prototype. This bank's prototypical calculator can be interpreted as a country-representative calculator. In addition, by applying that measure, we could identify representative banks for each calculator across countries. Lastly, the use of the Galanter metric enabled us to compute distances between individual calculators and reference calculators. Consequently, we can assess how far banks' individual calculators are away from what they should be. This analysis is necessary to answer the second research question concerning differences between the current state and the target state of information and thereby judge about the quality of information given.

3.4 Results

The results show that the countries differ in the amount and type of calculators available on their banks' webpages. Each of the analysed banks in Germany, the USA, and Chile provides a loan calculator. Whereas the Chilean banks do not provide any other calculator, almost all of the U.S. and German banks provide an affordable-purchase-price calculator, and almost half of the banks provide an income-expenses calculator and a rent-vs.-buy calculator (Table 2). The reference model recommends providing all four calculators to enable potential customers to make an informed decision. Consequently, the Chilean banks are farthest from this recommendation. In both other countries, the situation could be improved if banks offered income-expenses and rent-vs.-buy calculators on a regular basis.

To obtain an overview of the calculators' similarities and differences, we examined the prototypical calculators. Every prototypical calculator has most similarities with (i.e., the smallest distance to) all other calculators included in the computation. The distance values indicate that the calculators are highly heterogeneous. This observation is true across and within countries (Table 3).

Table 2: Number of banks providing calculators

	Calculator			
Country	Income-expenses	Rent-vs.-buy	Affordable-purchase-price	Loan
Germany	3	4	6	7
USA	3	2	6	7
Chile	0	0	0	7
Total	6	6	12	21
Reference model	1	1	1	1

Across countries, the distance values range from 0.7 for the income-expenses calculator to almost 0.9 for the rent-vs.-buy calculator. Thus, the respective calculators represent all other calculators of the same type only in small parts. The situation within countries is comparable. An exception is formed by the value for the income-expenses calculators of the U.S. banks "Wells Fargo" and "HSBC" (.4688) and the value for the loan calculator of the Chilean bank "Banco de Chile" (.628). The first result can be explained by the fact that only three U.S. banks provide an income-expenses calculator ("Wells Fargo", "HSBC", and "Bank of America"), and two of them are identical. The calculators of "Wells Fargo" and "HSBC" comprise the same concepts and explanations, such as "monthly income", "monthly payment", or "other debts" (Figure 2). The second result can be explained by the fact that the loan calculators of the Chilean banks have more in common than the loan calculators of banks in other countries.

Table 3: Prototypical calculators across countries and country-specific – distance values

	Calculator			
Country	Income-expenses	Rent-vs.-buy	Affordable-purchase-price	Loan
All countries	.7117	.8874	.8403	.8141
	Wells Fargo/HSBC	ING-DiBa AG	KeyBank	Banco de Chile
Germany	.8419	.8514	.8237	.8216
	ING-DiBa AG	ING-DiBa AG	LBBW	Hypo-Ver-einsbank
USA	.4688	.8876	.7676	.8154
	Wells Fargo/HSBC	Wells Fargo/KeyBank	HSBC	Citigroup-Inc.
Chile	-	-	-	.628
				Banco de Chile

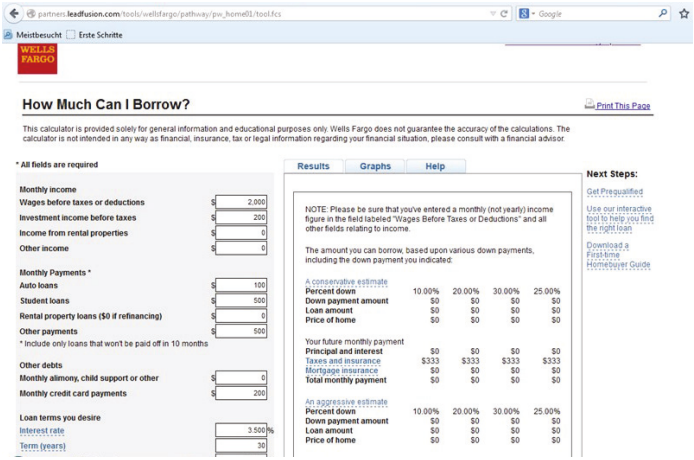


Figure 2: Income-expenses calculator Wells Fargo. Source: http://www.partners.leadfusion.com/tools/wellsfargo/pathway/pw_home01/tool.fcs (date: 2014-09-17)

After the description of the similarities and differences of the calculators, we specify the similarities and differences between banks' calculators and the reference calculators in the following. This analysis will allow us to assess how far the calculators are from what they should be, assuming they aim at supporting informed decision-making. To quantify the differences between the individual calculators and the reference calculators, distances based on the Galanter metric were calculated. Table 4 shows the means and standard deviations of distances between banks' calculators and reference calculators. In addition, the bank least differing from the reference model (see the value for *Min.* and the name of the bank in Table 4) and the distance between the prototype and the reference calculator is indicated. The data are given for both across all countries and within each country.

On average, the distances between the reference calculators and banks' calculators are remarkably high. Values range from approximately 0.7 (income-expenses calculator) to approximately 0.8 (rent-vs.-buy and loan calculator)—and even 0.9 (loan calculator). The minimal distance values range from 0.5 (income-expenses calculator) to 0.8 (loan calculator). In three out of four cases, the German bank "Commerzbank" is closest to the reference calculator, in the fourth case (regarding the loan calculator) the German bank "Norddeutsche Landesbank" is closest to the reference calculator. The "Commerzbank" distance values for the income-expenses calculator (0.5) and the rent-vs.-buy calculator (0.64), especially, are comparatively satisfying, indicating a remarkable overlap with the respective reference calculator.

Table 4: Distance to reference calculators – across countries and country-specific

	Calculator			
	Income-expenses	Rent-vs.-buy	Affordable-purchase-price	Loan
All countries				
M	.7167	.8553	.8361	.9017
SD	.1267	.1064	.0521	.0372
Min.	.5	.6441	.7027	.8148
	Commerzbank	Commerzbank	Commerzbank	Norddeutsche Landesbank
Prototype	.7143	.9118	.7666	.8696
	Wells Fargo/HSBC	ING-DiBa AG	KeyBank	Banco de Chile
Germany				
M	.7088	.8443	.8086	.8889
SD	.1991	.1336	.0535	.0435
Min.	.5	.6441	.7027	.8148
	Commerzbank	Commerzbank	Commerzbank	Norddeutsche Landesbank
Prototype	0.7297	.9118	.8333	.9118
	ING-DiBa AG	ING-DiBa AG	LBBW	Hypo Vereinsbank
USA				
M	.7247	.8772	.8636	.9177
SD	.018	.0397	.036	.0361
Min.	.7143	.8491	.8214	.8824
	Wells Fargo/HSBC	KeyBank	KeyBank	KeyBank
Prototype	.7143	.8876	.8947	.8837
	Wells Fargo/HSBC	Wells Fargo/KeyBank	HSBC	Citigroup Inc.
Chile	-	-	-	.8986
M				.0303
SD				.8627
Min.				Banco BICE
				.8696
Prototype				Banco de Chile

In contrast, the loan calculators are farthest from the reference calculator. This result might be explained by the fact that all banks provide loan calculators and that the loan calculators are the most comprehensive in terms of concepts and explanations. Therefore, the probability of heterogeneity in information is comparatively high. Lastly, the prototypical calculators are also quite different from the reference calculators. Values range from 0.7 (income-expenses calculator) over approximately 0.75 (calculator of the affordable purchase price) and 0.87 (loan calculator) to more than 0.9 (rent-vs.-buy calculator).

With regard to the individual countries, the situation in Germany does not substantially differ from the situation across countries. The U.S. situation shows that the rent-vs.-buy, affordable-purchase-price, and loan calculators of "KeyBank" come closest to their respective reference calculators. Concerning income-expenses calculators, the calculators of "Wells Fargo" and "HSBC" are closest to the reference calculator. However, the distance values are comparatively high. They range from 0.7 (income-expenses calculator) to 0.9 (loan calculator). In addition, the distances between prototypical and reference calculators are comparatively high. This finding indicates that the contents of the calculators differ in several respects from the reference calculators. Looking at Chile, only the loan calculator has to be taken into account. Compared to the situation in the other countries and the other calculators, the mean of the distance value is comparatively high (almost 0.9). The same is true both for the "Banco BICE", which comes closest to the reference calculator, and for the prototypical calculator. Those two calculators also differ remarkably from the reference calculator (distance values approximately 0.87). One reason for this result might be perceived in the fact that the Chilean banks provide country-specific concepts and explanations, such as the ID of the customer, which is usually not required by U.S. and German banks.

The calculator-specific view shows that, in general, the income-expenses calculators come closest to the reference calculator, that the loan calculators are by trend the farthest from the reference calculator and that the values for the other two calculators are in the middle.

To obtain first impressions about how the individual calculators correspond to or differ from reference calculators, the reference calculators and the prototype (as representative of a group of calculators) can be compared. Table 5 shows that, in general, the percentage of correspondence between the prototypes and the reference calculators is higher for concepts than for explanations. Approximately one-third of the concepts correspond to the reference calculators. The U.S. prototypes for the rent-vs.-buy calculator and the calculator of the affordable purchase price correspond even higher: 42.9% for the income-expenses calculator and 50% for the calculator of the affordable purchase price (Table 5). In both cases, the calculators of "KeyBank" repre-

sent the prototypes. In contrast, the German prototypes only correspond to 14.3% (rent-vs.-buy calculator) and 20% (loan calculator) with respect to the reference calculator. The values for the explanations are often zero or very low, for example 10% for the Chilean prototype, meaning that in many cases no or only a few explanations are given (Table 5).

To interpret the percentages (Table 5), we will give a brief overview of the contents that the prototypes and the reference calculators have in common and in that they differ. Concerning the income-expenses calculators, both the prototypes and the reference calculators include concepts such as "rental income" or the more general concept "other income". Concerning expenses, they include the concept "instalment for existing loans". Concepts included in the reference calculator but not the prototypes refer to some income positions, such as "net income", "child benefit income", "alimony income", and some expenses positions, e.g., "expenses for car and public transport", "saving expenses", "saving expenses for retirement", "property expenses/land taxes", "maintenance expenses", "expenses for telephone/tv/internet", "expenses for hobby/leisure" and "expenses buffer". In addition, explanations for "net income" and "free monthly income" are only found in the reference calculator, not in the prototypes.

Table 5: Percentage of correspondence between reference calculators and prototypes

	Calculator							
	Income-expenses		Rent-vs.-buy		Affordable-purchase-price		Loan	
Country	C	E	C	E	C	E	C	E
Germany	37.5	33.3	14.3	0	33.3	16.7	20	0
	ING-DiBa AG		ING-DiBa AG		LBBW		Hypo Vereinsbank	
USA	33.3	0	42.9	0	50	0	33.3	0
	Wells Fargo/HSBC		Wells Fargo/KeyBank		HSBC		Citigroup Inc.	
Chile	-	-	-	-	-	-	33.3	10
							Banco de Chile	

C = Concept, E = Explanation

Regarding the rent-vs.-buy calculator, all of the prototypes and the reference models consider the assumed rent increase. In addition, the U.S. prototypes from "Wells Fargo" and "HSBC" agree with the reference calculator in that they take into account concepts such as "principal", "interest", "term of the loan", and the "expected appreciation". However, the prototypes do not in-

clude concepts such as “expected inflation”, “property expenses/land taxes”, “additional fees”, “costs for rent”, “additional costs for buying”, “closing costs for the loan”, and “costs for maintenance”. Furthermore, explanations of the concepts “gross rent”, “net rent”, “additional costs for buying”, and “term of fixed interest” are part of the reference calculator, but not part of the prototype.

Examining the calculator of the affordable purchase price, we can see that both the U.S. prototype and the German prototype are in accordance with the reference calculator in that they concern concepts such as “down payment”, “annuity”, “principal”, and “affordable purchase price”. Contrary to the reference calculator, these calculators do not take into account concepts such as “additional costs for buying”, “free monthly income”, and “percentage of initial annual repayment”. Nor do they take into account explanations of these concepts.

Lastly, the analysis of the loan calculator shows that all prototypes and the reference calculator are in accordance concerning the concept “annuity”. Furthermore, the Chilean and U.S. prototype correspond with regard to the “term of the loan” and “interest”. Other than the reference calculator, the prototypes of the countries do not consider the “annual percentage rate”, the “term of fixed interest”, or the explanation of these concepts. In addition, they disregard concepts such as “repayment” and “mortgage” and explanations of “interest”, “residual debts”, or “closing costs”.

3.5 Summary, Discussion and Outlook

The results show that the banks of the countries differ remarkably in the number of calculators they offer on their webpages. All banks in the three countries provide a loan calculator. The Chilean banks do not provide any other calculator, but most of the U.S. and German banks provide calculators of the affordable purchase price, and half of them provide the income-expenses and the rent-vs.-buy calculators. The loan calculators are normally the most elaborate ones, consisting of more concepts and explanations than the other calculators. It seems that the banks focus on the loan calculator and, in doing so, draw the customer’s attention to the amount of money he or she can invest in a house. Thereby, the customer obtains an immediate impression of his or her available financial framework and a vision of the type of house within reach. However, the reference model recommends all four calculators to be provided. The Chilean banks are the farthest from that recommendation. The situation of some U.S. and German banks is characterized by a lack of income-expenses and rent-vs.-buy calculators. From that, we can conclude that the Chilean customers are comparatively under-supplied with online

information. The U.S. and German customers might not be able to gather detailed information about income and expenses and thus might only be able to roughly estimate their free monthly income. In addition, they may disregard contrasting the options renting and buying. However, the latter comparison might be irrelevant in cases where the customer desires and can afford a house independent of whether it is reasonable from a financial point of view. Then, motivation has priority over informed decision-making.

Concerning the question of similarities and differences between calculators, the distance values show that the prototypical calculators are, in general, comparatively far from the other calculators of the same type. This finding implies that the calculators are, in general, highly heterogeneous with regard to concepts and explanations offered. This conclusion is true for all types of calculators, both within and across countries. Consequently, there is only a small common ground of information. An exception are the Chilean loan calculators, which are comparatively homogeneous. We can conclude that, depending on which bank is consulted, the customer has different opportunities to learn about homebuying.

Regarding the differences between the current state (actual information) and the target state (information required by the reference model), the results show that the banks' calculators differ on average remarkably from the respective reference calculator. Again, this is true across and within countries. Even the calculators closest to the reference calculator (minimal distance) show comparatively high distance values. Across countries, the German banks bear the greatest resemblance to the reference calculators. This observation holds for the German bank "Commerzbank" regarding the income-expenses, rent-vs.-buy, and affordable-purchase-price calculator. It also holds for the "Norddeutsche Landesbank" regarding the loan calculator. The income-expenses and the rent-vs.-buy calculators, especially, reach comparatively good distance values, implying a relatively high degree of correspondence with the particular reference calculator. Starting from there, we might hypothesize that the loan calculator of the "Norddeutsche Landesbank" better supports the calculation of annuities than the calculators of the other banks. Furthermore, the calculators of "Commerzbank" might better support the comparison of renting and buying, income and expenses, and the calculation of the affordable purchase price. However, because the differences between the calculators and the reference model are remarkable, it can be questioned whether any of the calculators can support a comprehensive understanding at all. In general, banks' calculators provide less information than necessary to support informed decision-making and thus probably can only partly foster financial literacy concerning mortgages. This will be subject of future research.

Differences between banks' calculators and reference calculators can be explained mainly by differences in explanations and, subordinately, by dif-

ferences in concepts. In almost every case banks' calculators provide fewer explanations and concepts than required by the reference calculators. This finding is indicated by the comparison of the prototypes and reference calculators. However, it might be the case that a bank other than the prototypical one has more in common with the reference calculator. Therefore, the prototype as representative of a group of calculators can only be used to approximately describe the situation. This is especially true in cases where the prototype is comparatively distant from the other calculators. Independent of that, we assume that banks could foster financial literacy of their customers by providing more explanations.

The conclusions and hypotheses in this paper are based mainly on a comparison of banks' calculators and the calculators of the reference model. Thus, the reference model is of major importance. In this respect, it can be considered to further validate the model with more experts. In addition, it might be useful to work not only with a one-for-all reference model but also with complementary country-specific reference models. Beyond enabling country comparisons, this addition would allow us to take into account the unique characteristics of countries that otherwise have to be disregarded. Furthermore, the reference model is limited to information connected with calculators. However, some banks provide much more information concerning homebuying. Some U.S. banks, for example, developed learning programs and extensive brochures that they provide online. Thus, customers have many ways of becoming informed. However, the amount of information might be overwhelming. Closely connected with the scope of information provided is the question of whether it is rational from a bank's perspective to provide all information necessary or to motivate the customer to visit a bank consultant. To differentiate the perspectives of information providers, it also might be interesting to analyse information provided by independent consumer protection organisations. Those organisations may focus more strongly on the consumer's perspective and thereby may better support consumer decision-making. Other than the banks, consumer protection organisations might not be as strongly interested in pushing the potential homebuyer to visit a bank consultant.

We can conclude from our study that it is advisable to integrate comprehension and coping with complex financial products such as mortgages into curricula of financial literacy education. We reach this conclusion because the information on the web is not sufficient to support comprehension and informed decision-making, and informed decision-making should not be left to chance. When indicated, financial literacy education can be integrated into other subjects, such as mathematics and management. In the case of mortgages, it seems necessary to teach concepts and explanations concerning the four core elements (calculators), emphasize the options of renting and buying, and contrast income and expenses in detail. Furthermore, calculation

procedures (e.g., annuity calculations) should be applied. Beside the contents, media and methods have to be taken into account in regard to financial literacy education. Concerning media, factors such as multimedia design and text comprehensibility should be considered. Concerning methods, learning environments that foster learning activity and the application of knowledge should be implemented. As a result, learners should be supported in developing the competency to use online information about complex financial products for their purposes and to evaluate the quality of the information given.

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4 Financial Literacy and Financial Behavior among Young Adults in the United States[1]

Elizabeth Breitbach and William B. Walstad

4.1 Introduction

While financial literacy is important for the economic well-being of all individuals in society, it is especially important for young adults. It is at these early years of their adult lives (18 to 34 for the purpose of this study) they assume full responsibility for managing and directing their financial affairs. During a span of a decade or two for most individuals, they make multiple, life-shaping financial decisions that affect all aspects of their lives and their financial futures. They decide what type of post-secondary education they want to pursue and how to finance it. After they complete their post-secondary education, or sooner if they enter the workforce right after high school, they search for jobs and careers that give them both personal satisfaction and financial security. Once they are established in a work position, other financial decisions need to be made about job benefits related to insurance, health care, and retirement. It also is during these early decades of adult life that individuals typically form households with others and in the process jointly purchase a wide variety of goods and services, some of which can be quite expensive and require loans and financing, including automobiles, large appliances, or housing. Planning what part of household income to allocate to consumption and savings is a major challenge for most households in the early years when careers are just starting and goods and service society offers are so appealing. The situation becomes even more difficult over time with the addition of children to the household or the assumption of responsibility for an elderly parent.

During these formative years of financial responsibility, young adults are making financial decisions that affect their current and future economic well-being. These financial decisions can be very costly in both the short and long run. For example, if young adults make only minimum payments on a credit card it will not only result in substantial interest costs each month, but compounding over many months or years those interest costs can rapidly increase and become a significant burden that affects the financial future of these young adults. The costs of poor financial decisions can also be non-monetary

1 The authors thank the anonymous reviewers for helpful comments on a previous version.

or have indirect effects on the economic well-being of young adults. If an individual or household makes late payments on a credit card or defaults on a loan, it will lower their credit score. This negative effect can translate to difficulties obtaining credit in the future and can lead to a higher cost of borrowing money. Understanding the characteristics of individuals making such costly financial decisions and whether they are financially literate is a question of interest for both researchers studying financial decision-making and policymakers developing educational programs or regulations to improve financial conditions for young adults.

This study furthers that understanding by investigating the financial literacy of young adults, ages 18 to 34, and their financial behaviors. The data for the study comes from the National Financial Capability Study (NFCS).[2] This 2012 U.S. survey was commissioned by the Investor Education Foundation of the Financial Industry Regulatory Authority (FINRA) and developed in conjunction with the U.S. Department of Treasury, other federal government agencies, and the President Obama's Advisory Council on Financial Capability. The survey work and data collection were done by Applied Research and Consulting, an independent survey research firm. The NFCS provides a national representative sample of 25,509 adults, some 6,865 of which are young adults. The extensive survey includes questions about many financial behaviors related to such matters as credit card use, household purchases, bank accounts, student loans, and retirement saving. In addition the survey contains questions for measuring an individual's financial literacy.

This study contributes to existing literature on the financial literacy of young adults by exploring a new and large national data set that has not been analyzed. The data set includes a large number of young respondents and the data were collected after the financial crisis and Great Recession (2007-2009). The survey results should reflect the current thinking and views of financial matters among young adults. Furthermore, an analysis of the effect that financial literacy has on financial behaviors provides insight into the question of whether improving financial literacy will translate to young adults making less-costly financial decisions. The financial behaviors in this study include financial behaviors that have been previously investigated and new alternatives behaviors that can offer further understanding of the relationship between financial literacy and financial decisions.

The results from this study show that young adults in the United States have significantly lower levels of financial literacy than middle age or older adults. Within the sample of young adults, the financial literacy of women, minorities, and those individuals with low levels of education and income is especially low. The NFCS data set also were used to study the relationship between financial literacy and different financial behaviors. Behaviors related

2 See http://usfinancialcapability.org/ for full information about the data and access to it.

to credit cards and other financial behaviors young adults practice were examined, first, by making comparisons across the young cohorts, then by running a probit regression controlling for financial literacy and other demographic variables. The working hypothesis for the study was that young adults with higher levels of financial literacy will have financial behaviors that are less costly or problematic. The results generally support this hypothesis.

4.2 Literature Review

Previous research exploring financial literacy in the United States has found that individuals have relatively low levels of literacy (Lusardi & Mitchell 2014: 11; Allgood & Walstad 2013: 7; Knoll & Houts 2012: 401). Researchers have found that financial literacy is particularly low among some segments of the population: Hispanic and black Americans have lower levels of financial literacy, while Asian and white Americans have relatively higher levels (Lusardi & Mitchell 2011: 511; Lusardi & Tufano 2009: 9); females have lower scores than males (Jappelli & Padula 2013: 2786; Fonseca et al. 2012: 97; Lusardi & Mitchell 2008: 415); individuals with less education also have less financial literacy (Lusardi & Mitchell 2011: 511; Monticone 2010: 411); and unemployed workers are less financially literate than employed workers (Lusardi & Tuffano 2009: 17).

Existing literature on financial literacy has also reported that young adults have lower levels of financial literacy, relative to older cohorts (Lusardi & Mitchell 2014: 17; Allgood & Walstad 2013: 7). One potential reason for lower levels of literacy among young adults may be due to a lack of experience making financial decisions. Lusardi & Mitchell (2014: 17), however, argue that while older adults score relatively better on measures of financial literacy, they still have low levels of financial literacy. It does not appear that experience, based on age alone, increases financial literacy.

Whatever the reason for the low levels of financial literacy, it is important to determine whether these households are making costly financial decisions as a result of the lack of financial literacy. Agarwal et al. (2009: 71) suggest that younger and older adults are more prone to making financial mistakes, paying higher interest rates and failing to avoid costly credit card fees. The authors, however, were unable to control for the effects of financial literacy. While it is still expected that young adults will make financial mistakes, the effect of age on these mistakes or financial outcomes is likely to be reduced when financial literacy is taken into account in the analysis.

The majority of research on the financial behaviors of young adults has focused on credit card usage and behaviors. Credit cards are a commonly

used financial instrument among this age group and have allowed researchers to use large samples of young adults to make comparisons on their level of financial literacy and their behavior. Lachance et al (2006: 352) explored credit card behaviors of 18 to 29 year olds. The authors found that young adults with more credit card knowledge were more likely to hold at least one credit card and had an increased number of debts. Robb (2011: 695) also explored credit card behavior and financial literacy. Specifically he explored whether students paid off their balances each month or made only minimum monthly payments, whether payments were made on time, and if the students took cash advances on their credit card. He found that college students with higher levels of financial literacy were more likely to report engaging in responsible credit card behavior. Ludlum et al (2012: 27) also explored the credit card knowledge of college students holding at least one credit card. The authors inquired about interest rates, late fees, and other fees associated with a credit card and found the majority of students did not know basic information about their credit cards. Other research, looking at non-student populations, examining credit card behavior and financial literacy have reported similar results of low levels of financial literacy associated with "bad" credit card behavior (Allgood & Walstad 2013:12; Lusardi & Tufano 2009: 18).

Though the majority of research on young adults has focused on credit card behavior, there have been studies analyzing various other financial behaviors. Researchers have found that young adults are less likely to think about retirement (van Rooij et al 2011a: 601), participate in the stock market (van Rooij et al 2011b: 460), and save for emergencies (Babiarz & Robb 2014: 45; Zumbrun 2014). Young adults are also significantly more likely to be underbanked (Breitbach & Walstad 2014: 32). All of these studies suggest that young adults are more likely to engage in financial behaviors and practices that could be costly and have long-term adverse consequences on their financial well-being.

4.3 Data Sample and Measures

The 2012 NFCS sample consists of 25,509 adults, age 18 years or older, with approximately 500 respondents from each state and the District of Columbia. The online survey was completed between July and October 2012. The nationally representative sample of respondents is weighted for age, gender, ethnicity, education, and Census Division.[3] This study restricts the sample to 6,865 respondents between the ages of 18 and 34.

3 For further information see See http://www.usfinancialcapability.org/

The NFCS survey collected an extensive amount of information on the financial situation and self-reported behaviors of each respondent. The survey was divided into multiple sections covering a variety of questions to offer insight into the financial situation of the respondents. These divisions included (1) Financial Attitudes and Behaviors: These items inquired about the respondents' view of their current financial situation. Not only were respondents asked to rate their current financial situation, but questions concerning their spending and saving habits. Inquiries into the respondents' spending behavior relative to income, college and retirement fund savings, and knowledge of credit scores were included to better understand their financial situations. (2) Financial Advisors: Respondents were asked about their use of financial counseling on debt, savings, insurance, and tax planning. (3) Money Management: This section focused on gathering information on the means households use for receiving income and paying bills. Other questions also include banking practices related to transaction accounts and holding investments. (4) Retirement Accounts: Divided into two parts, this section surveys retirees about their planning and saving of funds before retirement and similar questions about the current behavior of those who are not yet retired. (5) Sources of Income: Respondents are asked about the various forms of income they have received over the past twelve months, including salaries and wages, income from a business, money from non-family members, and funds related to retirement and Social Security. (6) Home and Mortgage: New to the 2012 survey are questions about value of the respondents' home and whether the value is worth more or less than the remaining balance on their mortgage. Inquiries are also made into whether the household has made late payments or have been involved in a foreclosure process. (7) Credit Cards: Credit card usage and behaviors are the focus of this section. (8) Other Debt: Respondents are questioned on any other debt they may hold in this section. This debt includes auto, unpaid medical bills, student loans, and whether the respondent has declared bankruptcy. Respondents are also questioned on their use of alternative financial loans, such as "payday" loans, tax anticipated refunds, and pawn shops. (9) Insurance: Respondents answer whether they have health and life insurance policies.

One of the major advantages of the NFCS is that it contains five questions for assessing an individual's level of financial literacy. These five questions have been frequently used for research studies of financial literacy (Hastings, Madrian & Skimmyhorn 2013: 356). They also have been found to be valid indicators of financial literacy in studies of financial behavior (Lusardi & Mitchell 2014: 10). The questions are:

Suppose you had $100 in a savings account and the interest rate are 2% a year. After five years how much do you think you would have in the account if you left the money to grow? More than $102*, Exactly $102, Less than $102

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? More than today, Exactly the same, Less than today*

If interest rates rise, what will typically happen to bond prices? They will rise, They will fall*, They will stay the same, There is no relationship between bond prices and the interest rate

A 15- year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less. True*, False

Buying a single company's stock usually provides a safer return than a stock mutual fund. True, False*

Respondents also had the opportunity to respond don't know or refuse to answer each of these questions. When calculating an aggregate financial literacy score, don't know and refused responses are treated as incorrect.

This study using the NFCS data has two major objectives. The first one is to assess the financial literacy of young adults using the five questions financial literacy question. The second one is to investigate the relationship between financial literacy and financial behaviors. Although many financial behaviors could be studied, for the sake of parsimony, this research focuses on credit card and bank account behavior, planning for retirement, and paying off student loans. The NFCS survey provides sufficient information and data about these financial behaviors for the analysis. While the question of credit card behavior has been explored often in other studies, as noted in the literature review, this current and untapped NFCS data set will allow for an updated comparison on the effect of financial literacy. The other financial behaviors, bank account management, retirement planning, and paying for students loans too have been studied by researchers, but not with this latest NFCS data set. The current analysis should offer more insight into the relationship between financial literacy and financial behaviors related to credit, debt, and saving.

4.4 Financial Literacy of Young Adults

Previous literature has found that young adults have lower levels of financial literacy, relative to older cohorts. This result has been confirmed using the 2012 NFCS data set. Table 1 presents descriptive statistics of financial literacy by age cohort. Financial literacy is measured using the number of correct responses an individual answered for the set of five financial questions. Compared to individuals falling into the 35 to 54 year old cohort, those in the youngest cohort answer significantly fewer questions correctly. Comparing the youngest cohort to those 55 years and older leads to even greater differ-

ence, the oldest cohort answers one additional question correctly. Since there are a total of five questions used to measure financial literacy, these results are relatively large in magnitude and represent a significantly lower level of financial literacy among the youngest adults.

The table then separates the young adult cohort into three groups, 18 to 24, 25 to 30, and 31 to 34-year-olds. This division allows for further examination into the financial literacy of young adults. The youngest cohort, 18 to 24-year-olds, has the lowest levels of financial literacy, answering less than half of the questions correctly. As age increases among the youngest cohort the number of questions answered correctly significantly improves by one half of a question. To put this change into perspective, think about set of five questions as if they are a representative sample from a longer 100-item test. In this case an increase of one half questions in the sample of five items would be equivalent to a ten question or ten percent increase in the longer 100-item financial literacy test.

Table 1: Financial literacy scores by age range

Full Sample	18 to 34	35 to 54	55 or older	
Financial Literacy (*SD*)	2.33 *(1.41)*	2.94 *(1.44)*	3.30 *(1.38)*	
Observations	6,865	9,505	9,139	
Young Adults	18 to 34	18 to 24	25 to 29	30 to 34
Financial Literacy *(SD)*	2.33 *(1.41)*	2.06 *(1.35)*	2.43 *(1.39)*	2.59 *(1.44)*
Savings Question	0.690	0.645	0.711	0.720
Inflation Question	0.420	0.357	0.436	0.480
Bond Price Question	0.210	0.180	0.221	0.240
Mortgage Question	0.650	0.575	0.687	0.730
Stock Question	0.370	0.306	0.381	0.430
Observations	6,865	2,581	1,990	2,294

Table 2: Mean differences for financial literacy among young adults: selected characteristics

Age		
	18-24 vs. 25-29	-0.405***
	25-29 vs. 30-34	-0.181***
Gender		
	Male vs. Female	0.430***
Race		
	White vs. Black	0.300***
	White vs. Hispanic	0.172***
	White vs. Asian	-0.260***
Household Composition		
	Married vs. Single	0.260***
Living Situation		
	Alone vs. With Spouse	-0.150***
	Alone vs. With Parents	0.187***
	Alone vs. With Others	-0.017
Education Level		
	Less than a High School Degree vs. High School Degree	-0.409***
	High School Degree vs. Some College	-0.484***
	Some College vs. College Education	-0.514***
Work Force Participation		
	Employed vs. Unemployed	0.783***
	Employed vs. Not In the Work Force	0.365***
Income		
	Less than $15k vs Between $15k and $25k	-0.067
	Between $15k and $25k vs. Between $25k and $35k	-0.214***
	Between $25k and $35k vs. Between $35K and $50K	-0.168**
	Between $35K and $50K vs. Between $50K and 75k	-0.280***
	Between $50k and $75k vs. $75K or more	-0.246***

Table 1 also includes a breakdown of each individual financial literacy question by age. For all questions used to measure financial literacy, the youngest cohort answers the fewest correctly. Relative to individuals in the 30 to 34 age cohort, fifteen percent fewer 18 to 24-year-olds correctly answer the mortgage question. This is question is considered to be one of the "easiest" questions in the survey, with the highest percentage of all individuals answering it correctly. The youngest cohort also answers the inflation and stock questions correctly significantly less often. The likely reasons for these outcomes is that this young cohort has the least experience with financial matters and also may not yet appreciate the value of this type of knowledge.

Table 2 explores the financial literacy of young adults by demographic characteristics. T-tests were used to determine whether there was a significant difference in the financial literacy score among various demographic groups. As Table 1 indicated, those in the youngest cohort have the lowest levels of financial literacy, correctly answering nearly half a question less. The difference between the 25 to 29-year-olds and 30 to 34-year-olds remains significant, but the result is much smaller in magnitude. As young adults grow older they may find that financial literacy becomes more valuable, therefore they are more likely to spend time and money to acquire financial information. The increase in financial literacy score may reflect this change in attitude about the value of financial literacy or may be an artifact of gaining more experience with personal finance.

Results indicate that young females answer significantly fewer questions correctly, on average about half a question. As previous research has indicated women have significantly lower levels of financial literacy (Fonseca et al 2012: 97) and even from a young age (Danes & Haberman 2007: 54). The likely effects of race and ethnicity also followed those presented in previous research, black and Hispanic minorities have significantly lower levels of financial literacy, relative to whites or Asians (Lusardi et al. 2010: 366; Lusardi & Mitchell 2014: 20).

Household composition and living arrangements are also included as an indicator for the financial situation of young adults. Relative to single respondents, married respondents have higher levels of financial literacy perhaps because they can combine their knowledge and learn from each other. They also may have to make a wider range of financial decisions involving work or children. Young adults that remain living with their parents answer significantly fewer questions correctly probably because they are less responsible for personal finances or have less interest in financial affairs. The other explanation offered above may also be true among these two groups, married individuals and those living alone may find that financial literacy is more valuable and therefore spend more time investing in it.

Consistent with previous literature, as education levels increase an individual is significantly more likely to be financially literate. This results is to

be expected. For those individuals with higher levels of education it is less costly for them to learn about financial matters because they already have the general knowledge and learning skills that can be used to improve their financial understanding and education.

Employed respondents answer significantly more financial questions correctly compared to those who are unemployed and those not in the work force. Employed respondents likely have a greater need for financial literacy, as they have income that must be allocated to expenses and savings. This outcome can also be seen from the results on income. As income increases respondents answer significantly more questions correctly.

4.5 Some Financial Behaviors of Young Adults

The NFCS survey asked respondents about their credit card use. Six survey items particularly relevant about the credit card use of young adults were the following: (1) I always paid my credit cards in full; (2) In some months, I carried over a balance and was charged interest; (3) In some months, I paid the minimum payment only; (4) In some months, I was charged a late fee for late payment; (5) In some months, I was charged an over the limit fee for exceeding my credit line; and, (6) In some months I got a cash advance. To prevent costly use of credit card, most financial experts, with the exception of the first statement, do not recommend that young adults adopt these practices.

The results from the responses to these credit card behaviors and other financial behaviors are shown in Table 3. The credit card behaviors offer an interesting insight into the financial practices of young adults. As age increases among the youngest cohorts, individuals are more likely to pay only the minimum payments and carry a balance on their credit card. This result suggests that older individuals within the youngest cohorts have more cash flow problems. This hypothesis is further supported by the result that the older cohort is more likely to overdraw their bank account. These results are consistent with the idea that as age increases among young adults, their finances become more complex. Individuals may have graduated from college and must begin paying back debt accumulated from school. In addition, these households may be increasing their consumption by purchasing new cars, houses, getting married and having children. At this point in the lifecycle, the decisions households make can cause expenses to rise above income for a period of time.

Table 3: Financial behaviors by age cohort

	18 to 34	18 to 24	25 to 29	30 to 34
Credit Card Behaviors				
Pay Credit Card in Full	0.324	0.307	0.325	0.344
Carry a Balance	0.294	0.195	0.340	0.376
Minimum Payments	0.270	0.206	0.309	0.316
Late Fees	0.144	0.115	0.161	0.165
Limit Fees	0.089	0.073	0.094	0.103
Cash Advance	0.103	0.083	0.109	0.122
Other Financial Behaviors				
Non-Retirement Investments	0.213	0.153	0.211	0.290
Check Credit Score	0.436	0.339	0.516	0.490
Overdraw Bank Account	0.227	0.180	0.257	0.259
Plan for Retirement	0.286	0.194	0.320	0.371
Not Able to Pay Student Loans	0.196	0.199	0.214	0.178
Observations	6,865	2,581	1,990	2,294

Table 3 also shows the results from the survey on questions related to investment, credit reports, bank accounts, planning for retirement, and student loan behaviors. The following were the five corresponding questions from the NFCS survey: (1) Not including retirement accounts, does your household have any investment in stocks, bonds, mutual funds, or other securities? (2) In the past twelve months, have you checked your credit score? (3) Do you or your spouse overdraw your checking account occasionally? (4) Have you ever tried to figure out how much you need to save for retirement? (5) Are you concerned that you might not be able to pay off your student loans?

Young adults are facing complex financial decisions for the first time, many of these decisions involve spending. These individuals are purchasing new automobiles, homes, paying off debt accumulated during school, starting families, and while still enjoying their youth. During this period of the lifecycle it is expected that expenses are high and saving and investing can be difficult. This change is reflected in the small percentage of young adults who report holding non-retirement investments. Only fifteen percent of households in the youngest cohort hold these investments, but the percentage increases to nearly thirty percent for those in the older cohort.

Nearly half of the young adult population report checking their credit score. The percentage checking their credit score was expected to be higher than other behaviors in this category due to the high level of spending that occurs during this period of the lifecycle. Young adults may be applying for

credit cards, loans, and mortgages that require a good credit score. Checking a credit score would indicate these households are planning to take out debt or monitoring their accounts for identity theft, both of which would represent good financial decisions.

Over 20 percent of young adults report overdrawing their bank accounts occasionally, with the majority of these households falling into the older cohorts. As previously stated, these household are in a period of their lifecycle that is characterized by high spending and low savings. This can create cash flow problems for households that can result in overdraw bank accounts. While this behavior is not unexpected, it can be very costly for a household, average overdraft fees in 2012 were $31 (Bell 2012). Consider overdrawing a bank account as a type of short-term loan from a bank. Suppose an individual overdraws their bank account by $100 for thirty days; paying a $31 fee is equivalent to an annual percentage rate (APR) in excess of 370 percent. This is significantly higher than the APR on most credit cards and some payday loans.

Less than thirty percent of all young adults report planning for retirement. This low rate of planning is consistent with previous literature on retirement planning and saving among young adults (Lusardi & Mitchell 2011: 511). While the percentage of all young adults remains low, the breakdown by cohorts reveals that as age increases individuals are more likely to report planning for retirement. This ranges from less than twenty percent for those between 18 and 24, to nearly forty percent for those 30 to 34. This is the expected result: as households age, they begin to place more value on planning for the future, including their retirement.

Many discussions on the financial situations of young adults focus on their student loans. Often mentioned are their large debts and the ability to pay off these loans. Among young adults with student loans in the United States, nearly twenty percent report they are concerned about their ability to pay off these loans. The percentage remains fairly consistent among all cohorts of young adults.

4.6 Credit Card Behaviors and Financial Literacy

Although assessing what people know about financial matters provides some indication of their degree of financial sophistication, and finding out how people say they do with respect to financial matters offers insight into their financial behavior, what is more interesting is how financial literacy is related to self-reported financial behaviors or outcomes. Table 4 reports the marginal effects from a set of probit regressions on a variety of credit card behaviors and the influence of financial literacy. Only young adults that report holding

one or more credit card were asked about their credit card behavior. Despite the fact that only coefficients for financial literacy, age cohort, and number of credit cards are presented in Table 4, other demographic variables are also included.[4]

Table 4: Financial literacy and credit card behavior

	Pay in Full	Carry a Balance	Minimum Payment	Pay a Late Fee	Pay a Limit Fee	Receive a Cash Advance
Financial Literacy	-0.009	0.015**	-0.015**	-0.265***	-0.033***	-0.033***
	(0.007)	*(0.007)*	*(0.035)*	*(0.006)*	*(0.005)*	*(0.005)*
18 to 24 year olds	0.151***	-0.131***	-0.063**	-0.019	-0.002	0.003
	(0.020)	*(0.026)*	*(0.020)*	*(0.022)*	*(0.018)*	*(0.020)*
24 to 30 year olds	0.028	-0.020	0.012	0.008	-0.004	-0.003
	(0.024)	*(0.023)*	*(0.604)*	*(0.020)*	*(0.016)*	*(0.017)*
4 or more Credit Cards	-0.076***	0.130***	0.075***	0.094***	0.087***	0.075***
	(0.023)	*(0.022)*	*(0.001)*	*(0.020)*	*(0.017)*	*(0.018)*
Observations	4,309	4,309	4,309	4,309	4,309	4,309
Pseudo R2	0.080	0.055	0.052	0.041	0.073	0.053

Note: Marginal effects are reported. The following demographic characteristics were also controlled for: gender, race, household composition, living situation, education level, workforce participation, and income.
*** p<0.01, ** p<0.05, *p<0.10

For the most part the results in Table 4 are what would be expected. Young adults with higher levels of financial literacy are significantly less likely to report making only the minimum monthly payment, paying a late fee, paying a limit fee, or receiving a cash advance. The fees paid on credit cards are often very costly, both in terms of monetary and non-monetary cost, such as negatively affecting your credit score. A reduction of one's credit score can adversely affect future loan potential and raise the interest rates on loans.

The one exception in the results is the significantly negative relationship between higher financial literacy and carrying a balance on their credit card. This unexpected outcome may be explained by the effect of the lifecycle on the spending patterns of young adults. The permanent income hypothesis suggests holding debt as a young adult is not a "bad" financial decision. Young adults often have student loans, auto loans, mortgages, and credit card debt. Even though financially literate individuals are carrying a balance on

4 Other demographic variables include gender, race/ethnicity, household composition, living situation, education level, workforce participation, and income.

their credit card, results also indicate they are making more than the minimum monthly payment. Relative to many other debts that a young adult would hold, a credit card would have a significantly higher interest rate. If literate respondents are making at least the minimum payment on all debts, but more than the minimum payment on highest interest rate debt, the result should be interpreted as a "good" decision for the young adult's current financial situation.

Results presented in Table 4 also show that young adults with four or more credit cards are more likely to report less than ideal credit card behaviors. Respondents with many credit cards are significantly more likely to report making only the minimum monthly payment, paying fees, and receiving a cash advance, relative to those holding fewer cards. More credit cards may indicate that these individuals have higher levels of debt or problems budgeting and therefore are significantly more likely to engage in these costly credit card behaviors.

4.7 Other Financial Behaviors and Financial Literacy

The majority of existing literature on young adults has focused on credit card behavior, however the NFCS data set also allows for exploration of other financial behaviors. Table 5 reports a variety of other financial behaviors that will offer insight into the financial practices of young adults. The coefficients on financial literacy and age cohort are presented, though controls for other demographic characteristics are also included.[5]

The coefficient for financial literacy is in the expected direction for the other financial behaviors analyzed. Column 1 reports the findings on whether a household has any investments in stocks, bonds, mutual funds, or other securities, not including any retirement accounts. Results indicate that individuals with higher levels of financial literacy are significantly more likely to report holding some non-retirement investments, even after controlling for income. This result is consistent with the result found by van Rooij et al (2011b) on stock market participation in the Netherlands.

Column 2 presents results for whether the individual has reported checking their credit score in the past twelve months. It is important that information appearing on your credit report is accurate and the report can be used to monitor for identity theft, both of which are considered good financial behaviors. Those with higher levels of financial literacy are significantly more likely to state that they have recently checked their score. The initial

5 Other demographic variables include gender, race/ethnicity, household composition, living situation, education level, workforce participation, and education level.

result of age on viewing a credit score remains significant, those in between 24 and 30 years old are more likely to report viewing their credit score, relative to those in the older cohort.

Overdrawing a bank account can be a very costly financial behavior, the average overdraft fee was $31 in 2012 (Bell 2012). Overdrawing a bank account can be the result of poor budgeting skills or failure to adequately monitor the account, either of these can be seen as a "bad" financial behavior. It is expected that young adults with higher levels of financial literacy would be less likely to overdraw their accounts. Results confirm the hypothesis is true. For each additional financial question a respondent answers correctly they are two percent less likely to overdraw their bank account.

Table 5: Financial literacy and other financial behavior

	Investment	View Credit Report	Overdraw	Plan for Retirement	Not Likely to Pay Back Student Loans
Financial Literacy	0.022***	0.020***	-0.019***	0.028***	-0.012*
	(0.004)	*(0.006)*	*(0.005)*	*(0.005)*	*(0.006)*
18 to 24 year olds	0.011	0.017	-0.019	-0.017	0.035
	(0.016)	*(0.020)*	*(0.017)*	*(0.018)*	*(0.025)*
24 to 30 year olds	-0.023**	0.078***	0.018	0.007	0.039*
	(0.014)	*(0.019)*	*(0.016)*	*(0.017)*	*(0.021)*
Observations	6,865	6,865	6,865	6,865	4,150
Pseudo R^2	0.179	0.090	.039 0	0.116	0.057

Note: Marginal effects are reported. The following demographic characteristics were also controlled for: gender, race, household composition, living situation, education level, workforce participation, and income.
*** p<0.01, ** p<0.05, *p<0.10

Previous literature on retirement planning has reported that very few young people have tried to figure out how much they will need to save for retirement. However, planning and saving for retirement at a young age can ease the future burden. Results presented in Column 4 show that individuals with higher levels of financial literacy are significantly more likely to state that they have begun planning for retirement. For each financial literacy question answered correctly, the individual was three percent more likely to plan for retirement. This result is significant and relatively large in magnitude.

The final variable of interest is whether the young adult is concerned they may not be able to pay back their student loans. Only respondents who have at least some college education and reported having student loans are included in the analysis. Individuals with higher levels of financial literacy are significantly less likely to report they have this concern. This result indicates financially literate young adults may be better at managing their money or choose majors that had higher rates of return than their counterparts.

When examining the mean differences reported in Table 3, there were many significant differences among age cohorts. The significance of age decreases when examining the probit regression coefficient on financial literacy. This result suggests that it is not age alone that is driving differences in behaviors, but more importantly financial literacy. Improving the financial literacy of young adults can help them make more informed, less costly, financial decisions.

4.8 Conclusion

This study analyzed data on the financial literacy and behaviors of young adults in the United States. Using a nationally representative data set, a means test was used to compare the financial literacy of young adults relative to older cohorts and also to show differences based on demographic characteristics within the young adult cohort. Consistent with results presented in previous literature, young adults do have a significantly lower level of financial literacy, relative to their older counterparts (Lusardi & Mitchell 2014: 17; Allgood & Walstad 2013: 7). Among young adults between the age of 18 and 34, females, minorities, less educated, and low income individuals had significantly lower levels of financial literacy.

Financial behaviors were also studied, first making comparisons across age cohorts, then controlling for financial literacy and other demographic characteristics. Many of the behaviors were significantly different across young adult age cohorts, however these effects were reduced in magnitude and significance when financial literacy and other demographic controls were included. The effect of financial literacy on the credit card behaviors was mixed. Those young adults with higher levels of financial literacy were less likely to pay only the minimum balance, pay fees associated with late payments and limits, and take out a cash advance, suggesting that higher levels of financial literacy are associated with good financial practices related to credit card use.

The results also showed, however, that young adults with higher levels of financial literacy also were more likely to carry a balance on their credit card. This contrary outcome raises the issue of what it means for an individual to

engage in a "good" financial practice. If young households have large levels of debt from different sources, it is ideal to make payments on all these debts to avoid defaulting on any loans. Any additional funds at the end of the month are typically used to pay down the debt with the highest interest rates. The results on credit card behavior among the financially literate suggest that, although they do carry a balance on their credit cards, they are making more than the minimum payment. These payments may be the best financial decision the respondent can make given income constraints and the structure of their debt.

Although the majority of existing literature on financial literacy and young adults focused on credit card behavior, this research also examined a variety of other financial practices to examine the effect of financial literacy. The results were consistent with the initial hypothesis, those with higher levels of financial literacy were significantly more likely to make to non-retirement investments, figure out how much savings was required for retirement, and view their credit scores. The financially literate young adults were also less likely to overdraw their bank accounts and respond negatively to the belief that they would not be able to pay back their student loans.

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Section II:
Economic Competence

5 Learners' Economic Competence in Switzerland: Conceptual Foundations and Considerations for Measurement[1]

Doreen Holtsch and Franz Eberle

5.1 Preamble

Economic education is justified by both its function as preparation for activities in the professional economic domain and its role in preparing young people for general participation in the economy and society (a general educational function). The latter has been highlighted in recent years in many countries, predominantly with reference to the continuing economic and financial crisis, high youth unemployment, and the risk of personal and business bankruptcies. In Switzerland, the debate leading to the introduction of direct democratic action and decision making has also been brought to the table. Through their participation in referendums, Swiss citizens have the right to co-determine economic and social developments in Switzerland and to submit citizens' initiatives. For example, in 2014, a citizens' initiative made it possible to vote for a unified health insurance fund, a flat-rate tax on foreign millionaires, and a requirement for the central bank to retain a certain level of gold reserves, among other issues.[2] To make informed decisions about such issues, citizens must be economically competent.[3] It is questionable whether a direct need for economic education and the promotion of specific competencies can be derived from this requirements and/or the requirements of the economic-professional domain; if so, such justification would correspond to a naive variant of the logic underlying educational goals (Eberle 1996: 22 ff.; Beck 1992: 567 ff.; Heid 1977: 837). We assume, however, that a full justification can be rendered (for the general educational function see, for example, Eberle (2006)) and that commercial apprentices require a corresponding economic education to prepare them for both their professions and their participation in society and economic policy.

1 We wish to express our sincere gratitude to the LINCA project team – Sarah Forster-Heinzer, Eva Höpfer, Silja Mentele, Andrea Reichmuth and Madeleine Scherrer – for their input on the article and their contributions to the model.

2 See details at http://www.admin.ch/ch/d/pore/va/vab_2_2_4_1.html.

3 Financial literacy is a necessary but insufficient part of economic literacy.

The aim of this paper is to present an economic competence structure model for Switzerland that is suitable for commercial apprentices. We can refer to similarities in German and Austrian economic and/or commercial education and training. Nevertheless in Switzerland, the adaptation of such concepts, models, and instruments is limited. In Switzerland, commercial vocational education has incorporated the professional and general educational objectives described above into its training and education plans and curricula in a way that is explicit and unique among nations. In the following pages, when we model the competencies to be promoted, we will refer to this real-life educational situation. Therefore, we first outline the characteristics of commercial training in Switzerland. We then present an economic competence model that includes the described objectives of economic education, which are characterized by standardization, and the current discussion on the concept of competence. The focus here is on representing the structure of the economic competence of apprentices in the commercial sector in German-speaking Switzerland. We will also present the similarities between this model and German competence models. In addition to the commercial dimension, Swiss commercial vocational education requires an economic-civic dimension. The theoretical-conceptual considerations presented are based on work that has been developed within the framework of the Swiss Leading House *Learning and Instruction for Commercial Apprentices (LINCA).*[4] LINCA aims to investigate apprentices' economic competence development in the commercial field.

5.2 Economic Education in Initial Commercial Apprenticeship in Switzerland

Commercial apprenticeship is the most frequently chosen type of Vocational Education Training (VET) in Switzerland, with a share of 19% of all VET. In contrast to other countries (e.g., Germany and Austria), Swiss initial commercial apprenticeship is characterized by a standardized vocational school education. Regardless of the industry sectors to which the commercial training belong, the apprentices are taught in common classes at the VET school. Apprentices who complete their vocational education and training in a bank and those who receive their training in a travel agency receive the same schooling. In contrast, practical vocational training and branch-related courses are organized on an industry-specific basis. This training model presents the vocational schools with a major challenge. At the end of vocational training, each apprentice should be qualified to exercise his or her profession in all 21 commercial

4 The State Secretariat for Education, Research and Innovation (SERI) subsidizes LINCA (2011-2016).

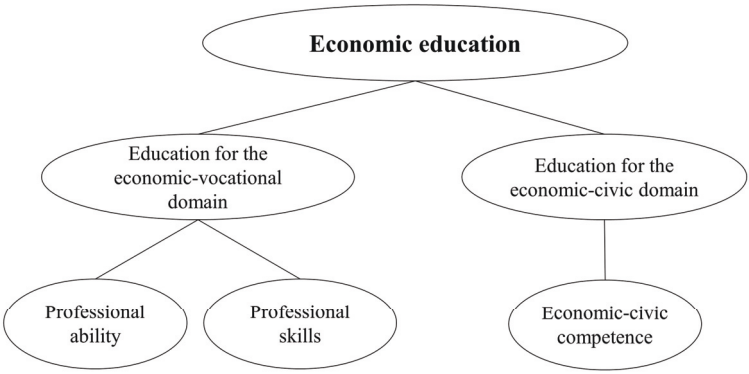
sectors. The initial commercial training is offered in three grades: 1) basic programme (a *Federal VET Diploma in Commerce*, basic programme, or *B-Profile*), 2) advanced basic programme, (a *Federal VET Diploma in Commerce*, expanded programme, or *E-Profile*) and 3) advanced basic programme with a vocational diploma (*Vocational Baccalaureate* or *M-Profile*). In principle, the duration of all three courses is three years. The vocational diploma can also be acquired by pursuing an additional year beyond the expanded basic training.

The comprehensive understanding of economic education described in the preamble is chiefly derived from the long-term work of Dubs (2014: 18). He makes it clear that economic education should prepare individuals for both subsequent professional activity and for participation in the economy and society outside the workplace. This twin objective is shown in Figure 1.

Training for the economic-vocational domain (on the left side of Figure 1) takes place in vocational schools, in companies that provide traineeships, and in branch-related courses and aims to prepare trainees for their specific professional activities; this training promotes vocational skills and/or competencies (Dubs 2014: 18).

The promotion of competence in the economic-civic domain (on the right side of Figure 1) also takes place in vocational schools, which have an explicit general education mandate in Switzerland. A general understanding of economics and society is necessary to enable the individual to understand and assess personal economic and social situations, regardless of his/her profession (Dubs 2014: 18).

Figure 1: Economic education according to Dubs (2014: 18)



In non-commercial vocational schools, vocational and general education contents are separated into corresponding disciplines. In commercial vocational schools, however, both general economic education and much of vocational economic education are taught as a single discipline – *economy and society* – which is responsible for promoting vocational and non-vocational economic competence. This model is internationally unique and, compared with other occupations that require training, peculiar to Switzerland. The discipline includes the classic economic areas of learning such as *economics, business administration, law,* and *finance and accounting*, while also covering aspects of *law and state*. The content of the discipline is similar for the advanced basic training levels with and without a vocational diploma (the E- and M-profiles), although the content is discussed in more detail at the advanced basic training level with a vocational diploma (the M-profile). Therefore, in the M-profile, the content is formally divided into the two disciplines: *finance and accounting (FA)* and *economics, business administration and law (EBL)*. Civic education is transferred to the discipline of *history and political science*.

Dubs' (2014) considerations are also specifically reflected in the curriculum for aspiring business people (Bundesamt für Berufsbildung und Technologie 2011)[5], in which the key objective of the *economy and society* discipline is explained as follows:

> To understand fundamental relationships, problems and challenges in enterprises, in the economy and in society, business people need thorough knowledge and basic insights. In the areas of financial interrelationships and accounting, business management and law, they are able to identify problems and propose, implement or evaluate solutions in their area of activity. They explain the essential relationships in the overall economy and are conscious of their responsibility and possibilities as economic and social citizens.[6]

The content of the discipline is formed by both commercial education ("*solutions in their area of activity ...*") and economic-civic education ("*… as economic and social citizens*"). A model of economic competence in the commercial sector must reflect these two objective dimensions in a way that embraces this unique Swiss characteristic.

5 Federal Office for Vocational Training and Technology
6 This key objective was translated for this paper.

5.3 Modelling of Economic Competence in LINCA

5.3.1 Understanding competence

The term *competence* comprises many very different definitions. Hartig and Klieme (2006: 128–129) summarize six variants of the concept of competence expounded by Weinert[7] as follows[8]:

1. Competencies as general cognitive performance dispositions that enable people to master very different tasks.
2. Competencies as context-specific cognitive performance dispositions that are functionally related to particular classes of situations and requirements. These specific performance dispositions can also be characterized as knowledge, skills or routines.
3. Competencies in terms of the motivational orientations necessary to master challenging tasks.
4. Competence to act in ways that integrate the first three concepts with regard to the requirements of a specific field of activity, such as a profession.
5. Competencies regarding the knowledge, strategies or motivations that facilitate the acquisition and application of specific competencies.
6. Key competencies in the functional sense, as stated in 2, that are relevant to a relatively wide range of situations and requirements. These include, for example, native languages or mathematical skills.

For matters of educational research, Hartig and Klieme (2006: 129) favour the second definition of competence as a good foundation. They justify this choice with reference to Weinert (2001a: 59), by arguing that basic cognitive abilities are standard equipment and can only be influenced in a limited way.

Various research works make frequent reference to Weinert's (2001b: 27–28) cognitive psychological concept of competence. This concept states that competencies

> [are] the cognitive abilities and skills available in or learnable by individuals for the solving of certain problems, and the associated motivational, volitional and social readiness and capacity to successfully and responsibly use the solutions in a variety of situations.[9]

This conception most closely corresponds with the fifth definition listed in Weinert's Organisation for Economic Co-operation and Development

7 Weinert (1999, cited by Klieme and Hartig 2006) summarized these conceptions in the context of an OECD report. Various articles on the definition of key competencies – including Weinert's definition – were collected and published in a book by Rychen, Dominique Simone and Salganik, Laura Hersh (2001): Defining and Selecting Key Competencies. Kirkland, Toronto, Bern, Göttingen: Hogrefe & Huber Publishers.

8 Hartig's and Klieme's German summary was translated into English for this paper.

9 This definition was translated for this paper.

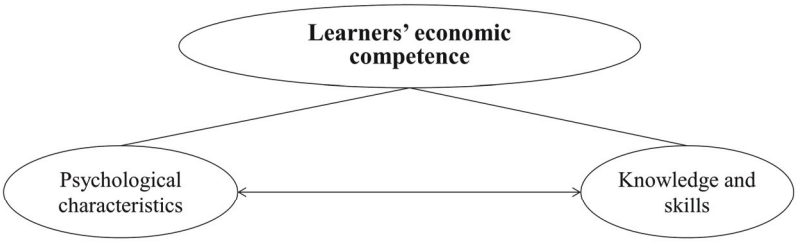
(OECD) report (1999, cited in Hartig & Klieme 2006: 128-129), which at least in part incorporates the preceding.

Regarding vocational and economic education, Seeber et al. (2010: 4) concluded that despite numerous differences, similarities can be found in the various definitions of and approaches to the conceptualization of competence. This conclusion implies, among other things, that competencies appear as context-specific performance dispositions in certain domains. In their work, Rosendahl and Straka (2011: 190) use this narrower definition of competence in relation to vocational training in Germany. This definition systematically neglects motivational aspects.

For the modelling of economic competence in Switzerland, we subscribe to a broader understanding of competence, as espoused by Weinert (2001b). Competence in this sense allows one to act responsibly and successfully in a professional environment. Economic competence is on the one hand based both on knowledge and skills and on the other hand, based on psychological characteristics.

The context or domain in which the competence is to be expressed is important for honing the competence's content, internal structure and level. Therefore, the next chapter presents a reflection on the domains that relate to economic competence.

Figure 2: The concept of competence in the commercial sector according to Weinert (2001b)



5.3.2 Reference domains for economic competence

The elements of knowledge and skills (cognitive skills and abilities), as shown in Figure 2, and the psychological characteristics (e.g., motivational disposition) used in the model can be general or domain-based. According to Klieme et al. (2007: 72), in expertise research, *domain* refers to a discipline or subject area. Weinert (2001a: 47) states that

> Specialized cognitive competencies refer to clusters of cognitive prerequisites that must be available for an individual to perform well in particular content area (e.g., chess playing, piano playing […]. The domains of specialized competencies can be very narrowly defined (e.g., chess competency) or very broadly and openly defined (e.g., diagnostic competencies in medicine).

Domains can also be other specific areas of learning and action (Seeber et al. 2010: 4). In our understanding, a domain can be an area of expertise, an area of activity, or an area of problem-solving.

The commercial and economic-civic objectives of Swiss economic education in initial commercial training relate to the specific competence in two different areas of activity and problem-solving. Therefore, a Swiss model for economic competence must include two domains.

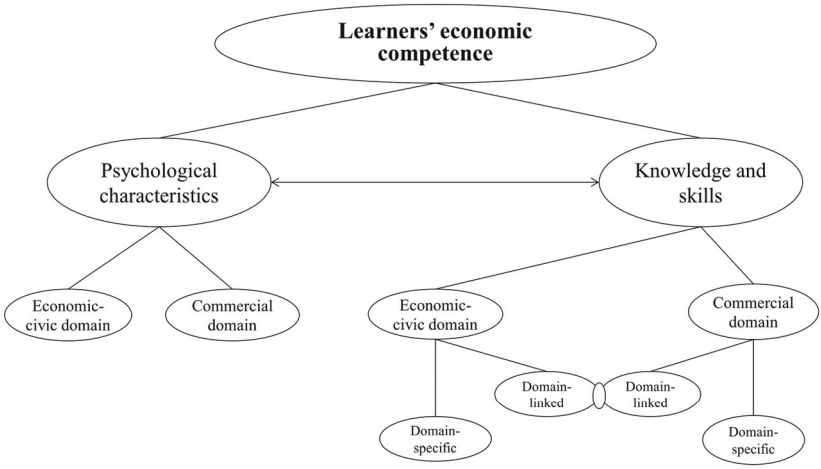
The competence to exercise domain-specific commercial activities or to resolve relevant problems, such as planning, executing and controlling professional activities in the workplace, should fall within the commercial domain. This competence includes, for example, the correct processing of a customer order (see also Table 1).

The competence to understand private, politico-economic and business administration problems in state and non-state social systems, evaluate proposed solutions, and personally develop solutions for simpler problems should fall within the economic-civic domain (Dubs 2014: 18). Economic-civic competence specifically facilitates the participation of all people, not just business people, in economic affairs, including the perception of citizens' democratic rights and duties. An example of this competence is the ability to understand and assess the actions of the Swiss National Bank with regard to the high exchange rate of the Swiss franc against the euro. Therefore, acting in this economic-civic domain demands not only financial literacy but also political and/or economic literacy.

Winther (2010: 31 ff., 79 ff.) proposes a further differentiation of the reference domains. Her concept of competence, based on the developmental psychological notions of Gelman and Greeno (1989), distinguishes between domain-linked and domain-specific competencies. Domain-specific competence refers to the mastery of the typical requirements within a domain, whereas domain-linked competence can support or intends to support the mastery of individual requirements within the domain.

This differentiation between domain-specific and domain-linked dimensions of competence applies to both the economic-civic and the commercial domains. The model of economic competence in the commercial sector thus appears as shown in Figure 3.

Figure 3: Model of economic competence in the commercial sector (own illustration according to Weinert (2001b) and Dubs (2014))



This model does not include other knowledge and skills relevant to competence, such as those related to subjects (e.g. German or mathematics), general cognitive areas, or general psychological characteristics (e.g., general and school-related self-efficacy beliefs and the general motivation to achieve).

The inclusion of both a domain-specific domain and a general educational domain in a single competency model is unique to the German-speaking region of Switzerland. In Germany, debate persists about the failure, until now, to include general economic education in competence measures in vocational schools. This debate arose around the discussion of standards for general economic education by the German Society for Economic Education (DeGÖB) (Seeber et al. 2012: 17–19).

Previous modelling and measurements of economic competence have mostly been concerned with one domain or the other. To develop an economic competence model for Switzerland, concepts and findings from both domains must be integrated. For the economic-civic domain, there is hardly any empirical evidence to support the construct; however, for the commercial domain, other connecting factors arise from studies of competence modelling and measurements. The next two chapters refer to relevant works.

5.4 Work and Research on Economic-civic Competence

There is a wide range of programmatic works on the concept of economic-civic competence, most of which fall under the heading of economic competencies or economic education; however, these studies were not further empirically investigated. Additionally, the competence model for economic education developed by Seeber, Retzmann, Remmele and Jongebloed (2012) arose from a comparison and discussion of various earlier proposals. This model formed the basis of the educational standards for general economic education, which have implemented the requirements set forth in the expert opinion by Klieme et al. (2007) for the Conference of the Ministers of Education and Cultural Affairs of the States (KMK).

In German-speaking Switzerland, as part of the Economic Competencies in Swiss Upper Secondary Education (OEKOMA) study[10], the theory and research status of the modelling and measurement of economic competencies was reviewed, and economic-civic competence was ascertained from a representative sample of high school graduates (Schumann & Eberle, 2014). Consistent with Weinert the authors Schumann and Eberle (2014: 107) understand *economic competencies* as

1. *Economic knowledge and skills as a prerequisite for solving economic problems (the core dimension of economic competencies),*
2. *Interest in economic problems and motivational orientations with the aim of solving economic problems; and*
3. *Attitudes and values that allow economic problems to be deliberated and responsibly resolved.*

The authors were able to demonstrate that the contents of the fields of business administration, economics and accounting can be distinguished as three separate knowledge dimensions. Furthermore, the data from the study show positive correlations between motivational orientations, interests and attitudes towards knowledge and skills (Schumann & Eberle 2014: 115). The Swiss economic competence model is based on the OEKOMA-conception of economic-civic knowledge and skills as well as psychological characteristics (Figure 4).

5.4.1 Work and research on commercial competence

To differentiate the commercial part of the Swiss economic competence model, we may best refer to findings from business education for the com-

10 The Project *Economic Competencies in Swiss Upper Secondary Education* is financed by the Swiss National Science Foundation.

mercial sector of German-speaking region.[11] In vocational and economic education, three major empirical studies provide clues about the structure of competence in the commercial sector: the ULME study by Lehmann and Seeber (2007), the commercial competence structure model of Winther and Achtenhagen (2008), and the findings described by Rosendahl and Straka (2011) about aspiring bankers.

The ULME study (Lehmann & Seeber, 2007) is one of the first studies in the field of vocational training in which the professional competencies for various occupations that require training, including seven commercial occupations, were comprehensively modelled and measured. In addition to measuring specialist knowledge and general cognitive skills, the learners' biographical, social and motivational characteristics were measured. To model knowledge, the authors used a modified matrix by Anderson and Krathwohl (2001). They modelled tasks in which declarative, conceptual and procedural knowledge (knowledge categories) must be a) reproduced, b) understood/applied or c) criticized/deliberated (Hofmeister 2005)[12]. No *a priori* assumptions were made regarding the specialized dimensionality of the competencies because the model was used for various partly commercial/technical occupations that require training (Seeber et al. 2010: 5). However, the empirical data on becoming office clerks showed that knowledge in economics, business administration and law, and accounting had a two-dimensional nature (Lehmann & Seeber 2007: 108–109, 117).

Achtenhagen and Winther (2008; 2009a; 2009) base their commercial competence structure model on two dimensions: understanding and action. The understanding-based dimension involves specialized knowledge of economic literacy and numeracy in the work context. The action-based dimension involves specific problem-solving skills in work situations; the measurement of this dimension is computer-based and aided by business processes in purchasing, sales and work scheduling. Using a sample of aspiring industrial clerks near the end of their training, the authors show that the understanding- and action-based dimensions can be differentiated with regard to three business transactions. Furthermore, Winther (2010: 100–117, 234–243) adds a level model based on the complexity of the content, the functional modelling and the cognitive classification of tasks; this model was confirmed empirically.

Rosendahl and Straka (2011) show that for aspiring bank professionals, the postulated general economic and banking-economic dimensions can be empirically confirmed. Their exploratory findings indicate that, as in the ULME

11 The connection is primarily justified by the comparability of vocational training systems between Germany and Switzerland and the resulting generally conceptually comparable understanding of competence.

12 Anderson and Krathwohl (2001) describe six cognitive process dimensions, which are summarized as three dimensions in the ULME study.

study, sub-dimensions of specific specialist categories are also conceivable (Rosendahl & Straka, 2011: 214). However, a better data fit is achieved for sub-dimensions created through business processes, as in the case of Winther and Achtenhagen (2009b: 539)[13]. In their discussion, Rosendahl and Straka (2011: 214–215) suggest that competence models that provide both specialist dimensions and dimensions based on work and business processes may be able to better explain the data. According to Rosendahl and Straka (2011: 215), such a concept requires, *inter alia*, the development of appropriate instruments.

These findings imply that understanding- and action-based commercial knowledge and skills should be modelled in the Swiss economic competence model. In addition, modelling and testing also require the adequate development and implementation of instruments. The implications for LINCA will be described in the following chapters.

5.4.2 Structure of economic competence in LINCA

The Swiss model of economic competence, which was developed as part of the LINCA project and that was explained and justified in Chapter 2, includes the commercial and economic-civic domains. Additionally, according to Hartig and Klieme (2006: 131), the internal structure of a competence model results from the situations and requirements that the competence (or competencies) is (are) intended to manage. In other words, the vocational commercial and non-vocational economic-civic competencies are promoted in a single discipline: *economy and society*. This is a Swiss peculiarity. A Swiss economic competence structure model is considerably more complex than comparable models from the commercial sector in the German-speaking region. The definitions of commercial and economic-civic competence can be found in Chapter 3.2, along with the fundamental distinction between domain-specific and domain-linked knowledge and skills. Figure 4 gives an overview of the other theoretical assumptions about the structure of economic competence, which are explained further below.

Psychological characteristics

According to Weinert (2001b) psychological characteristics should be considered in our economic competence model (see Chapter 3.1 and Figure 2). The psychological characteristics concern attitudes, interests and learning, and achievement motivation in relation to their respective domains. Together

13 Winther and Achtenhagen (2009b: 539) found indications of a three-dimensional model solution for each content area tested in the simulation; however, they opted for the more stable one-dimensional solution.

with the appropriate knowledge and skills, the psychological characteristics constitute the competence and may vary considerably between the two domains. For example, an individual's interest in commercial activities and his/her interest in economic-civic issues may differ.

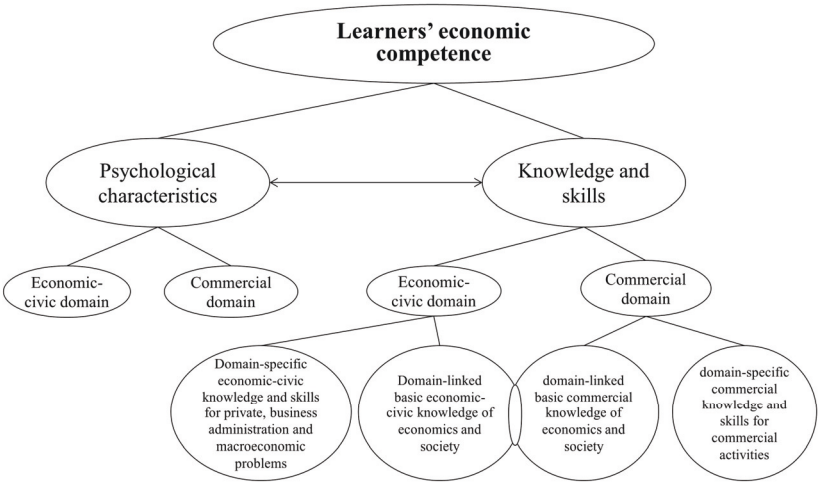


Figure 4: Structure of economic competence in the commercial sector

Commercial knowledge and skills

Domain-specific commercial knowledge and skills concern the actual, specific vocational knowledge and skills related to commercial activities. This knowledge and these skills are both understanding-based and action-based (e.g., the ability to process orders or the ability to obtain offers). Typical action situations are illustrated in the performance objectives of the curriculum for business persons (Bundesamt für Berufsbildung und Technologie 2011). Table 1 shows a sample of these situations.

Domain-linked commercial knowledge and skills can or should support the mastery of individual requirements in the specific domain of *commercial competence*. Domain-linked knowledge and skills cover the basic commercial skills required for (economic) vocational actions, which include economic literacy (e.g., the ability to understand business texts) and economic numeracy (e.g., the ability to calculate returns on investment) (Winther 2010: 54 et seq.), and further knowledge of business administration (e.g., about marketing) or economics (e.g., about market pricing). Domain-linked com-

mercial knowledge and skills are also important in other domains, such as the economic-civic domain.

Table 1: A selection of typical action situations in the commercial domain

Administer materials/ goods or services	Advise customers	Process orders	Execute financial processes
Recognize and manage the smooth, effective administration of goods, materials or services	Process customer enquiries professionally and in a customer-oriented manner	Process orders in a customer-oriented manner	Correctly process financial information

Economic-civic knowledge and skills

Domain-specific economic-civic knowledge and skills are those required to understand private, politico-economic and business administration problems in state and non-state social systems, to evaluate proposed solutions and to personally develop solutions for simpler problems. These abilities are based on real-life economic problems, such as the euro crisis, youth indebtedness, management salaries, public debt, energy policy, agricultural protection, safeguarding the old age and survivors' pension, and tax competition between the cantons.

Domain-linked economic-civic knowledge and skills are required to resolve economic-civic domain-specific problems. Similar to commercial knowledge and skills, economic-civic knowledge and skills are context-related linguistic, mathematical and technical abilities that interact with the mobilization of knowledge of business administration and economic models. The contents of domain-linked economic-civic knowledge and skills are logically structured and partially overlap with those of commercial domain-linked competence. Similarities are found mainly in the field of business administration.

Additional areas

Other knowledge and skill components and psychological characteristics are involved in the successful management of commercial action situations and the understanding, evaluation and solving of economic-civic problems; however, such components no longer represent the distinguishing features of the economic competence model. This knowledge and these skills belong to neighbouring domains, such as *law, history* and *political science*, and from general subject areas, such as *mathematics, German* and *foreign languages*, strategic learning, problem-solving knowledge, and general cognitive abilities. The other psychological characteristics, which are not closely linked to

the two domains, include general and school-related self-efficacy beliefs and general achievement motivation.

5.5 Measurement of Economic Competence in LINCA

The following chapter examines how economic competence, as described in Chapter 3.5, was incorporated into instruments designed to record the various components used in the currently ongoing LINCA project. Some of the instruments were adapted to the Swiss context. The adaptations included, for example, a reduction in the content and scope and linguistic adjustments. In addition to the adoption and partial adaptation of existing instruments, a range of new instruments was developed.

5.5.1 Measurement of psychological characteristics

Elaborate instruments were used to measure psychological characteristics. A questionnaire on psychological characteristics was created that contains items on learning motivation by Prenzel et al. (1996) and items on achievement motivation by Ramseier (2004). General and educational self-efficacy beliefs were determined using scales by Schwarzer and Jerusalem (1999) and Jerusalem and Satow (1999).

A new instrument was developed to measure individuals' interest in economic-civic issues (Holtsch et al. 2014). Items were developed regarding their interest in nine problem situations based on typical economic problems that citizens face; two items were created for each problem situation, thus, the instrument consists of 18 individual items. A sample item can be found in Table 2.

A new instrument was also developed to measure individuals' interest in commercial activities (Mentele et al. 2012). The current curriculum for commercial training was analysed for this purpose. In the context of the eight achievement objectives for the training company, the trainees are prepared for activities in, for example, customer service, order processing and administrative and organizational processes (Bundesamt für Berufsbildung und Technologie 2011). For each of the eight achievement objectives, three typical action situations were identified and represented in an item. The instrument consists of 18 individual items. A sample item can be found in Table 2.

Table 2: Sample items for measuring economic-civic and commercial psychological characteristics

Psychological characteristics	
Economic-civic domain	Commercial domain
Interest in economic-civic issues:	Interest in commercial activities:
"How interested are you in the extent to which the insurance for safeguarding the old age and survivors pension (AHV) is sustainable?"	"How interested are you in how customer interviews are conducted?"

5.5.2 Economic-civic knowledge and skills

The instrument for measuring economic-civic knowledge and skills includes items that were developed and used in the OEKOMA project (Schumann et al. 2010) and items from the German version of the *Test of Economic Literacy* (Beck & Krumm 1998). Additionally, new items were developed as part of the CoBALIT project[14]. In the instrument used to measure economic competence, trainees are confronted with typical problems and challenges in contemporary European society, such as the euro crisis, public debt, and energy policy. The instrument includes items that measure domain-linked and domain-specific economic-civic knowledge and skills. In the case of the domain-linked items, knowledge and skills pertaining to economic, business administration and financial concepts and terms are surveyed; the domain-specific items require economic-civic problems to be analysed and evaluated, proposed solutions to be assessed and/or individual solutions to be found. To avoid the effects of the item format, domain-specific and domain-linked items were developed, and both open and closed question formats were used. Sample items are presented in Table 3.

5.5.3 Commercial knowledge and skills

To measure vocational commercial competence in aspiring industrial clerks in Germany, Achtenhagen and Winther (2009) have developed the ALUSIM simulation, which they use to realistically measure workplace competence. ALUSIM was tested for adaptation to the Swiss context, and two independent studies showed that ALUSIM is limited in scope from the start of training for all of the authentic work tasks of Swiss trainees in the 21 industry sectors (Eberle et al. 2012a; Eberle et al. 2012b). Therefore, a new computer-based

14 CoBALIT is a project network developing and implementing a test platform measuring competencies required in the commercial sector in Germany and Switzerland. For more information, please visit: http://ascot-vet.net/de/264.php.

instrument was developed: LINCA. For this purpose, school and occupational curricula were analysed, and common intersections of typically challenging commercial situations were identified. Three of these challenging situations were selected, and domain-linked and domain-specific items were developed. In this assessment, the students work in several departments of the fictitious company LINCA. They resolve domain-linked issues and process complex, domain-specific tasks (e.g., processing a request for a quote). The tasks are presented in the form of video scenarios, audio recordings or written assignments, and the domain-linked and domain-specific tasks are embedded in specific work situations. Both domain-linked and the domain-specific items were integrated into the computer simulation to measure the individual facets within a setting and to avoid instrument effects. Table 3 shows sample items.

Table 3: Sample items for measuring economic-civic and commercial knowledge and skills

	Knowledge and skills	
	Economic-civic domain	**Commercial domain**
Domain-linked	Who is eligible to receive pension insurance?	The company LINCA sends an invoice to the customer. Which VAT rate is used for the cost of transportation and beverages?
Domain-specific	What effect does an increase in the retirement age, e.g., to 68 years, have on the employment market? Name and explain two influencing factors.	"Dear Sophie, would you please post the attached receipts according to the net method? Thank you, Nicole" (work order by e-mail)

5.6 Outlook

In LINCA, the validity of the dimensions of competence for Swiss commercial education, which embraces all sectors, is to be empirically tested over a protracted period of time. The first survey took place at the beginning of training in the autumn of 2012, the second survey took place in the middle of the second year of training at the beginning of 2014; and the third survey was performed in early 2015. A fourth survey will take place shortly before the final examination in the spring of 2015. The first reliable empirical findings and detailed analyses of the complete economic competence model will be available at the end of 2015.

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6 Effects of Students Sociocultural Background on Economic Competencies in Upper Secondary Education

Andreas Jüttler and Stephan Schumann

6.1 Introduction

One of the main tasks of educational systems is to promote young people's competencies and support them on their path to adulthood (Fend 1981). Thereby, educational systems can be described as "sorting machines" that stratify the forthcoming generation and allocate life chances (Kerckhoff 2001). This allocation or stratification should be determined only by students' academic achievement rather than by ascribed attributes such as social status, migration background and gender. This claim is known as the "meritocratic principle" (Solga 2008). However, it has often been shown that educational systems cannot fulfil this principle. There is a large body of evidence that social and ethnic disparities exist in many countries, with ethnic differences being primarily due to social inequalities (Becker & Schubert 2011; Breen, Luijkx, Müller & Pollak 2009; Kronig 2007; Schimpl-Neimanns 2000; Shavit & Blossfeld 1993). Switzerland is one of the countries where such disparities were widely discussed following the publication of the "PISA 2000" study results in particular (Baumert & Schümer 2001; Becker & Lauterbach 2007b; Ramseier & Brühwiler 2003; Maaz, Watermann & Baumert 2007; Zutavern, Brühwiler & Biedermann 2002), the following PISA-studies (Konsortium PISA.ch 2011, 2014) and data gathered in the TREE-Project (*Transition from Education to Employment*) (Hupka-Brunner et al. in press; Kost 2014; Scharenberg et al. 2014; Schumann 2011).

Meanwhile, a large amount of research exists on sociocultural disparities in school competencies such as mathematics, science and reading comprehension. However, with respect to many other domains, we can also observe a striking empirical deficit–amongst others–in economic competencies. Given the growing complexity of economic processes in private life and in the modern and internationalised world, economic competencies play an important role in preparing young people for social participation (Eberle 2015; Schumann & Eberle 2012, 2014a). Against this background, the present article provides further insights into the relationship between learners' sociocultural characteristics and economic competencies by analysing data

from the OEKOMA[1] study (Schumann, Oepke & Eberle 2011; Schumann & Eberle 2014a).

6.2 Theoretical and Empirical Background

6.2.1 Upper secondary and tertiary education in Switzerland

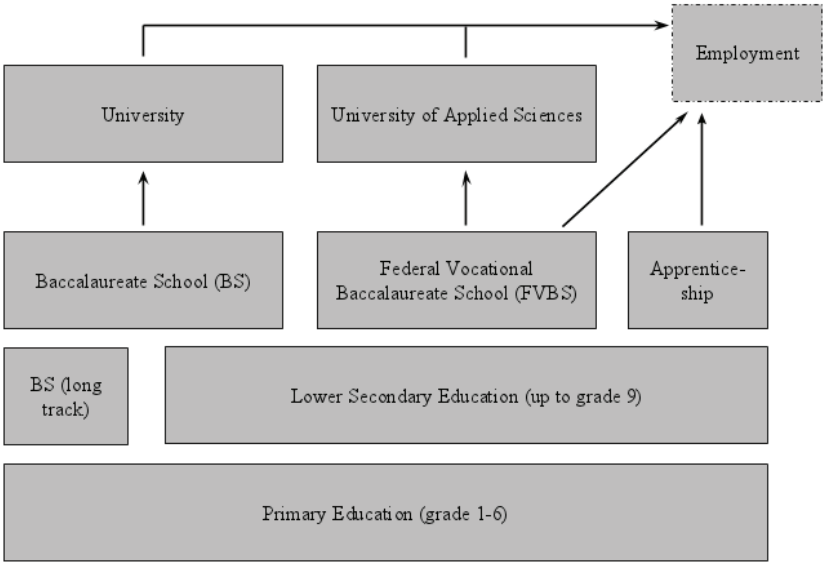
Traditionally, the Swiss educational system comprises two main tracks: an academic track to universities via Baccalaureate Schools (BS, Gymnasium) and a more practical track to vocational education and training (VET) via the regular schools (beyond the BS). Figure 1 presents an illustration of the Swiss educational system. Until the early 1990s, there was a de facto impermeability between the two tracks following lower secondary education. In line with the institutionalisation of universities of applied sciences in the 1990s, a new opportunity in VET was created – the Federal Vocational Baccalaureate Schools (FVBS). The FVBS connect an occupational education with deeper general education in six different profiles (e.g., commercial profile). The degree at this newly developed type of VET school permits unconditional but regular profile-specific access to Universities of Applied Sciences (Gonon 2013). The Federal Vocational Baccalaureate is an important instrument of permeability within the Swiss education system. To date, it has primarily been perceived as a "story of success" (ibid.), although newer findings have shown that permeability as a single structural instrument cannot decrease social disparities without improving the resources that determine educational success (Hillmert & Jacob 2008; Kost 2014; Schumann 2011).

In the present paper, two questions will be answered: 1) the extent to which there are sociocultural differences between students in these two types of schools, and 2) whether the two school types are associated with the same or different factors in determining economic competencies. To understand possible differences, it is important to know the extent to which economics is taught in the tracks and profiles. In BS and FVBS, economic education is obligatory and taught in discrete courses. In BS, this course is called "Economics and Law", which can be taken as a basic (depending on the canton, it consists of approximately one lesson per week) or as a major course (4 to 6 lessons per week). In FVBS, all students must take the "Business Administration/Economics/Law" course. Students with a commercial profile have

1 OEKOMA was funded by the Swiss National Science Foundation (05/2010 – 07/2012) and can be translated as "Economic Competencies of Swiss Students at the End of Upper Secondary Education" (Project No. 130301).

more lessons per week than students with other profiles; furthermore, they additionally take the "Accounting and Finance" course.

Figure 1: Swiss educational system (simplified)



6.2.2 Competencies and sociocultural background

A majority of studies on economic competencies and their effects on learning outcomes have been conducted in the US. A first milestone was the report entitled "Economic Education in Schools", which was published in 1961 (Committee for Economic Development 1961). The report specified the contents and benchmarks for economic knowledge and skills in upper secondary education. Subsequently, the Test of Economic Understanding (TEU, National Council on Economic Education (NCEE 1964)) and the frequently used Test of Economic Literacy (TEL, Soper 1979) were developed.[2] Using the TEU, studies have identified a substantial lack of knowledge among students irrespective of their sociocultural background. Because the TEU was not particularly effective, international studies have mostly used the TEL or a translation of it (e.g., the German translation of Beck & Krumm 1990; Beck, Krumm & Dubs 1998) to measure economic competencies in the school

2 The fourth edition of the TEL is now available (Walstad, Rebeck & Butters 2013).

context. An overview of the results shows considerable differences between countries (Walstad 1994). Students in Australia, the UK and South Korea performed better, whereas the mean scores of students in the US, Germany, Austria, Switzerland and particularly Greece were low. Furthermore, only a few American and other international studies considered the effects of sociocultural background on economic competencies (Becker, Greene & Rosen 1990; Grimes & Millea 2011; Jackstadt & Grootaert 1980; NCES 2013; Walstad 1993; Walstad, Rebeck & Butters 2013), but rarely as the main question of interest; thus, there is a lack of research on students in secondary education. In general, only a few studies on students' competencies at the end of upper secondary education in Switzerland have been conducted (Eberle et al. 2008; Ramseier et al. 1999; Ghisla, Bernasconi & Poglia 2009; Schumann, Eberle & Oepke 2013, Schumann & Eberle 2014b). Except for the articles by Schumann, Eberle and Oepke (2013) and Schumann and Eberle (2014a, 2014b) that were based on OEKOMA data, none of the other studies have taken economic competencies into account. Moreover, these studies have not considered or reported data on sociocultural background.

The theoretical model developed by Boudon (1974) is often used to better understand the effects of sociocultural background (e.g., Becker 2012; Kost 2014; Schumann 2011). This model belongs to the rational choice theory and distinguishes two types of effects of social background: primary and secondary effects. As the migration background can be seen as a special case of social background (e.g., Becker, Jäpel & Beck 2011; Becker & Schubert 2011; Kalter 2008; Meunier 2011), these effects also explain disparities that arise because of migration backgrounds.

With regard to primary effects, Boudon (1974) summarised the effects that a family's socialisation has on the developing child. Typically, families from lower socioeconomic classes provide less stimulating environments because they have fewer resources available and, therefore, are at a disadvantage in terms of supporting their children's school performance. Resources must be not only economical but also cultural (the spoken language in the family, the availability of books and the appreciation of reading them) and social (e.g., contact with higher-privileged persons) (Bourdieu 1983). Children's school success is affected by these factors in the earliest years of childhood. Therefore, they start their school career at a lower competence level – and this disadvantage is increasing, at least in primary education (Ditton & Krüsken 2009; EDK-Ost 2010).

The secondary effects of social background are also important, especially in highly stratified educational systems such as that in Switzerland (Becker & Lauterbach 2007a; Becker 2010; Dustmann 2004; Griga & Hadjar 2013; Holm et al. 2013). These effects play a role in children's transitions within the educational system and refer to the effects of the availability of family resources on parents' educational decisions (Boudon 1974). Given equal

student abilities, there is a discrepancy in the different social classes' valuation of the benefits of higher education; these benefits are perceived as less valuable by individuals in lower social classes. At the same time, the costs of investments in education are valued higher by these classes. In contrast, those in higher social classes have a much greater risk of experiencing a loss of status (Keller & Zavalloni 1964). People from lower socioeconomic classes tend to regard higher education with contempt, which is related to their greater uncertainty concerning educational success. This uncertainty goes hand-in-hand with these parents' unfamiliarity with higher educational tracks. Hence, regardless of students' abilities, families from lower socioeconomic classes more often decide to forgo higher educational tracks.

Both primary and secondary effects have been observed and confirmed in many studies in Switzerland and Germany. Secondary effects particularly appear during preschool education (Arens 2007; SKBF 2011; SKBF 2014) and at the transitions from primary to lower secondary education (Arens 2007; Autorengruppe Bildungsberichterstattung 2008, 2010, 2014; Becker, Jäpel & Beck 2011; Becker 2013; Biewer, Wandeler & Baeriswyl 2013; Geißler 2006; Neuenschwander & Malti 2009; SKBF 2011; Zutavern, Brühwiler & Biedermann 2002), from lower secondary to higher secondary education (Arens, 2007; Baumert & Schümer, 2002; Neuenschwander & Malti 2009; Ramseier & Brühwiler 2003; Schumann 2011) and from higher secondary education to the tertiary level (Arens 2007; Autorengruppe Bildungsberichterstattung 2008, 2010; 2012; Buchmann et al. 2007; Kost 2014). Primary effects have also often been observed, although mostly for primary school and lower secondary education (Angelone & Keller 2014; Baumert, Watermann & Schümer 2003; Becker, Jäpel & Beck 2011; Becker & Schubert 2011; Ditton & Krüsken 2009; Ehmke & Jude 2010; Geißler 2006; Meunier 2011; Moser 2002; OECD 2001; Ramseier & Brühwiler 2003), with fewer effects found for upper secondary education (Kost 2014; Schumann 2011; Watermann & Maaz 2006).

Especially in the Swiss educational system, which is characterised by high stratification and early segregation, evidence exists of a strong association between children's sociocultural background and educational achievement (e.g., OECD 2002; Wößmann 2004) and attainment (e.g., Bauer & Riphahn 2006, 2007; Buchmann et al. 2007). For example, children with a disadvantaged sociocultural background perform worse in subjects such as reading comprehension and mathematics (Angelone & Keller 2014; Becker, Jäpel & Beck 2011), although these primary effects are mainly caused by socioeconomic differences between groups (e.g., Beck, Jäpel & Becker 2010). However, even after controlling for achievement, there are substantial differences in transitions, starting from preschool (e.g., SKBF 2014) up to tertiary education (e.g., Buchmann et al. 2007). Early segregation and school tracking increase these effects and strengthen the intergenerational perpetua-

tion of educational track and class status (Buchmann et al. 2007; Pfeffer 2008).

Furthermore, there is considerable evidence that these effects on transition accumulate throughout the school career and play an important role at the threshold to vocational education (e.g., Beicht & Granato 2010; Konietzka & Seibert 2003; Solga & Menze 2013). Thus, the current state of research shows that sociocultural (primary) effects are minimised for apprenticeship (e.g., Seibert 2005). This fact is supported by research on the transition of students of lower socioeconomic backgrounds – mainly those with a migration background – from apprenticeship to work. It can be shown that these students are rather disadvantaged in terms of school and job performance and become victims of institutional discrimination by companies because of their specific background (e.g., Kalter 2006; Seibert 2011).

Overall, it can be assumed that effects of sociocultural background are particularly strong for early transitions in individuals' educational career (Mare 1981) and are cumulative across all transitions (Baumert, Watermann & Schümer 2003; Becker 2009, 2010; Hillmert 2005). Furthermore, there is empirical evidence that primary effects become weaker for transitions that take place later in the educational trajectory (Becker 2009; Blossfeld & Shavit 1993; Breen & Goldthorpe 1997) and that they are also minimised for apprenticeship.

However, as previously mentioned, none of the cited studies have examined economic competencies. The question, therefore, is whether there are primary effects on economic competencies and, if so, whether there are differences between the BS and FVBS school types.

6.3 Research questions

Following the theoretical framework and based on the state of research in the field, two research questions will be answered in this paper:

(1) Are there sociocultural effects on attendance in educational tracks (BS vs. FVBS) and profiles within these tracks (economic or commercial vs. other profiles)?
(2) Are there sociocultural effects on economic competencies after control of individual (e.g., gender) and contextual (e.g., educational track/profile) variables?

6.4 Method

6.4.1 Sample

Data from the SNF-Project OEKOMA are used for the analyses. OEKOMA is a cross-sectional study with a sample of 2,328 students from 150 classes from BS (N=1,277) and FVBS (N=1,051) in the German-speaking part of Switzerland. The students were surveyed by externally trained test administrators at the end of the 2010/2011 school year shortly before they received their degrees. Students in BS were stratified based on whether they took "economics and law" as major subject. Students in FVBS were stratified according to whether they had a commercial profile or non-commercial profile. A representative sample of 200 classes was drawn. The class-level return rate was 75%, and the student-level rate was approximately 64%. Analyses of dropouts showed that the non-participating classes did not differ from the participating classes regarding the criteria of interest (Schumann & Eberle 2014a).

Table 1: Descriptive sample statistics

educational track	profile	classes	students	gender		age	
		n	*n*	*female*	*male*	*M*	*SD*
Baccalaureate Schools	economics & law	42	666	280 (42%)	386 (58%)	18.6	0.9
	other	37	611	384 (63%)	227 (37%)	18.6	0.9
	total	79	1,277	664 (52%)	613 (48%)	18.6	0.9
Federal Vocational Baccalaureate Schools	commercial	35	525	307 (59%)	218 (41%)	19.6	2.3
	other	36	526	148 (28%)	378 (72%)	20.8	2.3
	total	71	1,051	455 (43%)	596 (57%)	20.2	2.3
total		*150*	*2,328*	*1,119 (48%)*	*1,209 (52%)*	*19.4*	*1.9*

Regarding gender, the typical Swiss distribution can be seen: male students dominate the "economics and law" profile of BS and the non-commercial profiles of FVBS, whereas this finding is reversed for the other two profiles. Regarding the sample as a whole, the gender distribution is nearly balanced. The students attending FVBS are more heterogeneous in terms of age and are older than the BS students.

6.4.2 *Instruments*

Achievement tests and one questionnaire were used to obtain information about the students' economic competencies and mathematics and reading comprehension abilities. The instruments for math and reading were developed within the EVAMAR II study (Eberle et al. 2008), which focused on students' aptitude for higher educational studies at the end of secondary education, whereas the test of the cognitive facet of economic competencies was newly developed for the purposes of OEKOMA. The test consists of 111 items that relate to economics, business administration and accounting and are mainly presented as multiple choice questions (5 items are open-ended questions). Modified newspaper articles were used to establish a proper context, and for each newspaper article, four to eight items were generated. The items were partly related to this introductory article, and a pool of 21 articles was developed. With an EAP/PV reliability of 0.75, the psychometric quality of the test can be described as sufficient (for more details, see Schumann & Eberle 2014a). Furthermore, the KFT 4-12R developed by Heller and Perleth (2000) was used to test students' cognitive ability as a control variable. Table 2 provides an overview of the test instruments.

Table 2: Instruments

Variable	Number of Items	Source
Economic Knowledge and Skills	111	Schumann & Eberle (2014a)
Cognitive Ability	45	KFT 4-12R (Heller & Perleth 2000)
Reading Comprehension	91	Eberle et al. (2008) / EVAMAR II
Mathematics	59	Eberle et al. (2008) / EVAMAR II

A questionnaire was used to gather data regarding migration and social backgrounds. The students were asked if they or one or both of their parents were born in Switzerland or abroad and which language was mainly spoken at home. Fathers' educational certificates were used as an indicator of a student's social background (family's educational background). The education of the mother and the father were taken into account and treated separately. Descriptive statistics will be presented according to the five different educational tracks (see next chapter).

6.4.3 *Procedures*

To answer the first research question, we will examine the extent to which there are differences in the distributions of the two educational tracks in

terms of migration status and the educational attainment of the fathers. Family educational background was categorised into five levels: 1) lower secondary (obligatory education), 2) upper secondary vocational, 3) upper secondary general, 4) tertiary B, 5) tertiary A (including doctoral degree). This categorisation does not represent any hierarchical order because theoretically, and especially in Switzerland, there is no reason to prioritise the general educational track over the vocational track or vice versa. In Switzerland, vocational education is highly respected (e.g., Hoeckel et al. 2009).

To construct an adequate migration index, it is necessary to distinguish between a *geographical migration* and a *linguistic migration* background. With regard to a geographical background, we followed the approach of Moser, Ramseier and Berweger (2002), who differentiated among five states of migration to describe an individual's geographical migration background. Table 3 provides an overview of the different geographical migration states. For linguistic migration background, it is necessary to distinguish the language spoken at home, which refers to whether the students speak with both parents, only one parent or with neither of their parents in the language of instruction. For the regression analyses, this variable was dichotomised; that is, a student was considered to have a linguistic migration background if he or she primarily spoke a language other than Swiss or German with at least one of his/her parents and/or friends.

Table 3: Geographical migration status

	student born in CH	*student born abroad*
mother born in CH/father born in CH	local	local
mother born in CH/father born abroad	cultural-mixed	cultural-mixed
mother born abroad/father born in CH	cultural-mixed	cultural-mixed
mother born abroad/father born abroad	2nd generation	1st generation

CH: Switzerland

The analyses will examine whether there are differences in students' reading comprehension, mathematics or economics abilities according to the previously described categories of educational and sociocultural backgrounds. To estimate abilities, weighted maximum likelihood estimators (WLE) were computed, z-transformed and then standardised[3] to allow comparisons. Because the distribution of the sample regarding the two educational tracks (BS and FVBS) is disproportionate to the distribution in the population, subsequent weighting of the data was necessary. All analyses in this paper take this weighting into account.

3 Standardised to a mean of 500 and standard deviation of 100.

6.5 Findings

6.5.1 Effects of educational tracks and profiles

Table 4 shows the descriptive findings separated by profile, aggregated for the two tracks (BS and FVBS) and for the total sample. As shown, the highest education of the fathers is not distributed equally among tracks and profiles, $<^2$ (12, N = 2,328) = 41.55, p < .01. Although there is no difference between BS and FVBS students in terms of lower secondary education, there is a difference within the FVBS track, $<^2$ (1, N = 912) = 5.12, p < .05. Regarding the percentage distribution, the fathers of students taking a commercial apprenticeship are 1.9 times[4] more likely to report lower secondary level as their highest education level compared to the fathers of students with a non-commercial education. Moreover, differences regarding the educational track of fathers of students graduating in BS versus FVBS are observed, $<^2$ (1, N= 2.186) = 36.49, p < .01. Students of FVBS are more likely to have a father who graduated in the vocational track, whereas parents of BS students are more likely to have completed their education in the general track. Regarding the percentage distribution in the tertiary A level, a BS student is 1.4 times more likely to have a father who graduated there than an FVBS student, $<^2$ (1, N = 2,186) = 21.41, p < .01. This finding is reversed for graduation in the tertiary B level, where fathers of FVBS students are overrepresented, $<^2$ (1, N = 2,186) = 12.76, p < .01. Overall, these effects balance each other such that there is no difference in total graduation at the tertiary level.

Table 5 provides an overview of the distribution of the geographical migration status across the different profiles. Although there are no significant differences for the four states of migration, there are differences for the dichotomised variable of commercial and non-commercial FVBS, $<^2$ (1, N = 912) = 5.58, p < .05. However, no unambiguous results are observed overall. Therefore, we further examined participants' linguistic migration backgrounds.

4 Calculation: 7.4 / 4.0 = 1.85. This value refers to the share of students and not the absolute number.

Table 4: Distribution of educational family background across tracks and profiles (in percent)

		lower sec.	upper sec. voc.	upper sec. gen.	tertiary B	tertiary A	voc. track	gen. track	upper sec.	tertiary
BS	economics & law	6.0	30.0	8.1	16.5	39.4	46.5	47.5	38.1	55.9
	other	6.5	38.8	7.0	13.3	34.4	52.1	41.4	45.8	47.7
	total BS	*6.3*	*34.2*	*7.6*	*14.9*	*37.0*	*49.1*	*44.6*	*41.8*	*51.9*
FVBS	commercial	7.4	40.6	5.7	19.2	27.0	59.8	32.7	46.3	46.2
	other	4.0	44.1	6.5	19.6	25.9	63.7	32.4	50.6	45.5
	total FVBS	*5.7*	*42.3*	*6.1*	*19.4*	*26.5*	*61.7*	*32.6*	*48.4*	*45.9*
	total sample	6.1	37.8	6.9	17.0	32.2	54.8	39.1	44.7	49.2

Abbr.: BS: Baccalaureate Schools; FVBS: Federal Vocational Baccalaureate Schools; sec.: secondary; voc.: vocational; gen.: general

The percentage of students with a linguistic migration background is only 13.8% compared to the 27.1% with a geographical migration background. Thus, many of the students with a geographical migration background speak German or Swiss in conversations with their family or friends. However, there some students do not, especially the non-commercial FVBS students, χ^2 (1, N = 2,328) = 9.62, $p < .01$. In this group, 90.3% of the students speak their official language with both parents, whereas only approximately 84% of the students with other profiles do so. Accordingly, only 9.7% of non-commercial FVBS students have a linguistic migration background, which is only half the share of BS "economics and law" students (see Table 6).

Table 5: Distribution of geographical migration background across tracks and profiles (in percent)

		status of migration				geographical migration background	
		local	cultural mixed family	2nd-generation immigrant	1st-generation immigrant	no	yes
BS	economics & law	69.5	14.8	11.5	4.1	69.5	30.5
	other	72.4	15.3	8.6	3.8	72.4	27.6
	total BS	*72.0*	*15.2*	*9.0*	*3.8*	*72.0*	*28.0*
FVBS	commercial	69.9	17.1	8.5	4.5	69.9	30.1
	non-commercial	77.4	14.4	5.4	2.9	77.4	22.6
	total FVBS	*74.3*	*15.5*	*6.7*	*3.6*	*74.3*	*25.7*
	total sample	72.9	15.3	8.1	3.7	72.9	27.1

Abbr.: BS: Baccalaureate Schools; FVBS: Federal Vocational Baccalaureate Schools

Table 6: Distribution of linguistic migration background across tracks and profiles (in percent)

		parents speak Swiss/German			linguistic migration background	
		both	one	none	no	yes
BS	economics & law	83.4	8.1	8.5	82.9	17.1
	other	85.8	7.0	7.2	85.1	14.9
	total BS	*85.5*	*7.1*	*7.4*	*84.8*	*15.2*
FVBS	commercial	86.3	8.0	5.8	85.9	14.1
	other	91.4	3.9	4.7	90.3	9.7
	total FVBS	*89.3*	*5.6*	*5.2*	*88.4*	*11.6*
	total sample	87.0	6.5	6.5	86.2	13.8

Abbr.: BS: Baccalaureate Schools; FVBS: Federal Vocational Baccalaureate Schools

Overall, the data show sociocultural background had a particular effect among non-commercial FVBS students. There are fewer students whose fathers' highest educational achievement was at the lower secondary level and fewer students with a linguistic migration background. Regarding the latter, the share of BS students is higher than that of FVBS students, χ^2 (1, $N = 2{,}328$) = 6.34, $p < .05$. Next, we will describe the way in which the groups differ in their economics (economic knowledge and skills), reading comprehension and mathematics achievement.

6.5.2 *Effects on test performances*

For the first analysis, the father's highest education level was again used as an indicator of social background. The analysis was conducted on the entire sample rather than separately for each profile. We used this approach because differences between the groups, independent of profile, are of greater interest. All results are displayed in Table 7.

An examination of the effect of social background on student performance reveals some unexpected results. For example, students whose fathers graduated at the lower secondary level have the highest average scores on reading comprehension (together with upper secondary education) and are the most homogeneous group. Students with a father at the tertiary B level receive the lowest average reading comprehension scores. However, the greatest difference is only approximately 7 points (one-sixth of a standard deviation) and is not statistically significant[5]. For the average scores in mathematics and economics, opposite results are found. In regard to mathematics, students with a father who graduated at the tertiary A level perform well, and students with a father who graduated at the tertiary B level show

5 ANOVA was used for significant testing.

the same math performance as students with a family background at the lower secondary level. This finding reverses, however, when we examine test performance in economics. In both cases, the large differences between students with a father who graduated from a tertiary track are striking. Specifically, in one case, students with a family background of the general tertiary A track perform significantly better (in mathematics, $p < .05$), and in the other case, students with a family background of the vocational tertiary B track perform better (in economics, $p < .01$).

With regard to migration background, a heterogeneous picture can also be observed. In regard to reading comprehension and mathematics, first-generation immigrants show the lowest test achievement. However, they perform proportionally well in economics, while the second-generation immigrants perform worse. These differences are significant only for second-generation immigrants ($p < .01$), and they are particularly affected by the second-generation immigrants' low test performance. Local students achieve the best results on all three domain-specific tests.

Table 7: Test performances in reading comprehension, mathematics and economics by sociocultural background

	Reading Comprehension		Mathematics		Economics	
Highest education of the father	*M*	*SD*	*M*	*SD*	*M*	*SD*
lower secondary level	515	92.8	496	83.1	472	97.0
upper secondary level voc.	515	112.3	512	109.7	489	94.5
upper secondary level gen.	504	97.0	509	102.3	471	101.1
tertiary B	498	97.2	498	100.7	494	103.4
tertiary A	504	115.1	522	114.9	474	111.5
Migration status						
1st-generation immigrant	485	91.6	497	81.4	482	89.2
2nd-generation immigrant	504	99.8	515	117.5	460	99.4
cultural mixed family	506	125.1	509	115.7	477	100.0
local	510	98.6	513	104.3	487	99.1
Parents speak Swiss/German						
none	481	127.7	517	112.8	466	108.4
one	516	118.2	495	100.6	469	102.0
both	510	94.4	513	105.6	485	100.1

Finally, we examined student test performance as a function of the parent's primary spoken language. Students who speak with both parents in a language other than Swiss or German have reading comprehension scores that are approximately 30 to 35 points (one-fourth of a standard devia-

tion, $p < .01$) lower than those who speak Swiss or German with at least one parent. We did not find this effect for mathematics. For economics, it appears more important for students to speak the official language with both parents ($p < .05$). However, for mathematics and economics, the differences are rather low relative to differences in reading comprehension.

With regard to the second research question, no unambiguous results for sociocultural background were obtained. The differences are rather small (nonsignificant) and unsystematic. Most significant results pertain to the language spoken at home as an indicator of migration background.

6.5.3 Multivariate analyses

To estimate the effects via multivariate analyses, we executed linear regressions. Regarding the influence of the highest parental graduation level on economic test performance, we dichotomised the variable of the highest educational degree of the parents to distinguish between two subgroups (subgroup 1: one or both of the parents have an academic degree (tertiary A) vs. subgroup 2: neither parent has an academic degree). With regard to the migration background, the "language-index" was used (speaking Swiss/German with both parents vs. speaking Swiss/German rarely with even one person or never speaking Swiss/German). These variables will be included in the linear regression in the next chapter to obtain evidence on variables that influence economic test performance and a clearer answer to the second research question. To eliminate effects of school type, the analyses were calculated separately for BS and FVBS.

Tables 8 and 9 display results by school type. First, for BS students, being part of an academic family does not have an effect on economic competencies. In contrast, we did observe an effect for migration background, although that effect is rather small. More importantly, there are differences in reading comprehension and mathematics and in students' cognitive ability. These factors explain 12% of the variance. While gender and profile represent two important variables, profile has the strongest effect. Overall, this model accounts for more than 21.2% of the variance.

The findings for FVBS are quite similar (see Table 9). Graduation of the parents and linguistic migration background have no effect on economic competencies and exhibit only a marginal influence on mathematics scores. The effect is nonsignificant in models 3 and 4 and only becomes significant in model 5, where profile was taken into account. Profile is the key factor concerning the differences in economic competencies and is more influential in FVBS analyses than in analyses for the BS students. Furthermore, reading comprehension test performance is important for FWBS students (as it is for BS students). In addition, gender has an effect, as male students perform better than females. Cognitive ability plays only a marginal role. Overall, model 5 explains 19.6% of the variance in economic test performance.

Table 8: Prediction of economic competence (Baccalaureate Schools, linear regression models)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Included Variables	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*
constant term	492.94	3.58	-	468.98	8.71	-	211.51	22.36	-	187.447	22.17	-	106.699	23.57	-
academic family (0 = no; 1 = yes)	-1.983	5.93	-0.010	0.278	5.81	0.001	1.658	5.51	0.008	0.040	5.43	0.000	-2.359	5.26	-0.011
linguistic migration (0 = yes; 1 = no)				27.421	9.24	0.097**	20.180	8.02	0.071*	20.683	7.798	0.073**	20.047	7.68	0.071*
reading compr.							0.196	0.03	0.190**	0.231	0.03	0.224**	0.248	0.03	0.240**
mathematics							0.107	0.03	0.108**	0.060	0.03	0.061	0.091	0.03	0.092**
CAT							0.191	0.04	0.180**	0.146	0.04	0.137**	0.137	0.03	0.129**
gender (0 = female; 1 = male)										38.558	5.57	0.195**	31.956	5.4603	0.161**
profile (0 = other; 1 = e&l)													61.431	7.32	0.310**
Observations			1.120			1.120			1.120			1.120			1.120
Adjusted R^2			0.000			0.010			0.127			0.163			0.212

Abbr.: e&l: economics & law; CAT: Cognitive Ability Test; B: regression coefficient; SE(B): standard Error of B; β: standardised regression coefficient

* $\rho < 0.05$; ** $\rho < 0.01$

Table 9: Prediction of economic competence (Federal Vocational Baccalaureate Schools, linear regression models)

	Model 1			Model 2			Model 3			Model 4			Model 5		
Included Variables	*B*	*SE(B)*	*β*	*B*	*SE*	*β*	*B*	*SE*	*β*	*B*	*SE*	*B*	*B*	*SE*	*β*
constant term	483.97	5.06	-	475.41	13.89	-	282.38	32.56	-	248.388	34.82	-	-56.957	49.34	-
academic family (0 = no; 1 = yes)	-12.427	9.38	-0.061	-11.737	9.48	-0.057	-8.548	9.17	-0.042	-8.937	9.16	-0.044	-9.278	8.64	-0.045
linguistic migration (0 = yes; 1 = no)				9.375	14.08	0.033	1.773	13.62	0.006	4.238	13.656	0.015	7.203	12.71	0.025
reading compr.							0.258	0.05	0.253**	0.302	0.05	0.296**	0.248	0.05	0.243**
mathematics							0.023	0.05	0.024	-0.003	0.05	-0.003	0.145	0.05	0.155**
CAT							0.149	0.05	0.140**	0.110	0.05	0.103*	0.090	0.05	0.084*
gender (0 = female; 1 = male)										25.422	9.47	0.129**	35.609	9.0178	0.180**
profile (0 = other; 1 = comm.)													78.093	9.42	0.341**
Observations			558			558			558			558			558
Adjusted R^2			0.002			0.001			0.087			0.097			0.196

Abbr.: comm.: commercial; CAT: Cognitive Ability Test; B: regression coefficient; SE(B): standard Error of B; β: standardised regression coefficient

* $\rho < 0.05$; ** $\rho < 0.01$

Thus, for the second research question, we can conclusively state that the highest education of the parents does not play a significant role when examining students' economic competencies. Linguistic migration only has an effect on BS students, but this effect is small and accounts for only approximately 1.0% of the variance. Therefore, neither variable is (very) important for explaining economic competencies. The effects of test performance in the other domains (mathematics, reading comprehension), cognitive ability, gender and the profile effect are much more important.

6.6 Summary and Discussion

This paper examined the extent to which there are sociocultural effects on students' attendance in educational tracks and profiles and economic competencies at the end of upper secondary education in the German-speaking part of Switzerland. In this chapter, our results are summarised and discussed.

6.6.1 Main findings

Results from linear regressions show that for both types of schools, the school profile has the strongest effect on economic competencies. Regarding the effects of sociocultural background on FVBS students, no effects are observed even when other abilities such as reading comprehension and mathematics are controlled. For BS students, there is a marginal effect of linguistic migration background, which is only partly explained by reading comprehension. The educational family background does not play a role. We can conclude, then, that there are no or only small primary effects on economic competencies at the end of upper secondary education. One potential explanation for this finding pertains to the upstream secondary effects (Becker 2010; Ramseier & Brühwiler 2003; SKBF 2011; Zutavern et al. 2002) that contributed to a highly selective sample in this study. Therefore, the educational system already functioned as a 'sorting machine'. Furthermore, the so-called 'scissors effect' appears such that from the point of transition, the differences in student achievement between different school types (tracks) are often even larger (Alexander & McDill 1976; Ansalone 2010; Hallinan 1988; Hanushek & Wößmann 2006; Kalogrides & Loeb 2013; Maaz, Baumert & Trautwein 2009; Oakes 1985; Ramseier & Brühwiler 2003). The strong stratification of the Swiss educational system supports these effects (Buchmann et al. 2007; Griga & Hadjar 2013; Pfeffer 2008); these findings are also consistent with findings for upper secondary education in Germany (Watermann, Nagy & Köller 2004) and other countries (e.g., Pfeffer 2008).

In line with our results, Ramseier and Brühwiler (2003) showed that at the end of lower secondary education, geographical and linguistic migration backgrounds do not affect the likelihood of attending BS or FVBS when controlling for cognitive abilities, social background and reading comprehension. The sample therefore consisted of "special" immigrants who made it to the end of upper secondary education (Blossfeld & Shavit 1993). When examining the regression analyses, it is also important to bear in mind that approximately 87% of the sample does not have a linguistic migration background, which also partly explains the weak effects in the regression analysis. The highly selective sample of FVBS students can also be partially explained by selection procedures at the beginning of apprenticeship because prejudice exists against young adults from educationally disadvantaged environments, especially when they have a migration background (Lehmann, Ivanov et al. 2013; Lehmann, Seeber et al. 2013; Solga & Menze 2013). Students with a migration background are consistently the least likely to start vocational training, even after controlling for educational achievement and socioeconomic background (e.g., BIBB 2011, 2012, 2013; Diehl et al. 2009; Solga & Menze 2013).

However, students with a migration background perform slightly worse in reading comprehension and economics. Reading comprehension, as a domain-independent key competence (OECD 2001), plays a special role, which is also clear from the results of the regression analyses. In this study, reading comprehension has the second strongest influence on economic competencies for both school types.

In contrast to social and migration backgrounds, gender has an impact, as male students in both schools types outperform their female counterparts. This result is consistent with previous data (Schumann & Eberle 2014b) and is a common finding when testing for (facets of) economic knowledge and skills (e.g., Jähnig 2013; Schmidt et al. 2015; Zlatkin-Troitschanskaia et al. 2013), although some studies have barely detected or not detected this effect (e.g., Williams, Waldauer & Duggal 1992). Several explanations have been put forth for the observed gender effect, including cultural reasons (Fann & Tsai 2010; Förster et al. 2015), test standardisation factors (e.g., multiple choice vs. open-ended questions) (e.g., Ben-Shakar & Sinai 1991), male students' stronger affinity towards economic themes (e.g., Williams, Waldauer & Duggal 1992) and structural characteristics of the (Swiss) educational and occupational systems (Buchmann et al. 2007). Because gender differences are not the focus of this article, these reasons will not be discussed in detailed here.

An examination of the economics and mathematics test scores shows differential effects concerning the educational background of the family. Students with a family educational background in the general track perform better in mathematics. However, they perform worse in economics, with

students with a background in the vocational track exhibiting better achievement.
Overall, we found no extensive differences in student characteristics between the two types of schools. Only non-commercial FVBS stand out, where the share of students with low social and migration background is small. Moreover, we observed effects for family educational background. Specifically, students of families with a vocational educational background are more likely to attend FVBS and, therefore, maintain their educational track. The same holds for BS students regarding the general track. Both findings support some type of intergenerational tracking between vocational and general education (see also Buchmann et al. 2007 for higher education in Switzerland). However, the present study does not indicate that sociocultural background is important for the prediction of the examined population's economic competencies.

6.6.2 Limitations and further research

One limitation of the study is the operationalisation of the background variables. The educational background of the father was used as an indicator of the family's social status. Of course, there are many other important factors that could provide more insight into the social family background, such as parents' vocational status, family income and cultural capital. All these factors are combined in the *International Socio-Economic Index of Occupational Status (ISEI)* (Ganzeboom, de Graf, Treiman & de Leeuw 1992), which is typically used to operationalise social background and should be used in further studies that link background effects to (economic) competencies. However, it must be noted that many empirical findings have indicated that among all background characteristics, family educational background is one of the most important factor(s) in individuals' educational attainment (Buchmann & Sacchi 1998; Pfeffer 2008). A second study limitation is that our data did not fully address Boudon's (1974) model because there was no consideration of variables pertaining to educational decision making. Thus, statements about primary effects were possible but conclusions about secondary effects were not. The operationalisation of these variables would have been necessary to make conclusions about such effects.

Regarding migration background, it would be helpful to know the concrete origin country of the students because immigrants of different parts of the world (Asia, Southern Europe, European Union, etc.) are characterised by varying performances (Angelone & Keller 2014; Kao & Thompson 2003; Lehmann, Ivanov et al. 2013). Additional information that was not considered in this analysis is the duration that immigrants had already lived in Switzerland. As previously mentioned, this factor could explain some variance in students' competencies (SKBF 2011) and should be considered in future

studies. Furthermore, because we only examined primary effects, future studies should more explicitly address the role of secondary effects.
A main limitation is the study's cross-sectional design and especially the fact that the study was conducted shortly before the students graduated. A suggestion for future research is the use of a longitudinal design that surveys students at the beginning of upper secondary education and again one or two years later and that considers variables regarding educational decisions. It would then be possible to observe the 'scissor-effect' and the characteristics of students who drop out before reaching the end of their upper secondary education.

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7 Facing Commercial Competence: Modeling Domain-Linked and Domain-Specific Competence as Key Elements of Vocational Development

Esther Winther, Dagmar Festner, Julia Sangmeister, and Viola Katharina Klotz

7.1 Introduction

The economic literacy and numeracy of young adults are not the only abilities necessary to master daily lives or succeed in today's complex economic environment. Yet as we examine in this chapter, they constitute determinants of the development of vocational competence for people entering a vocational training program (Lehmann & Seeber 2007). We argue that these concepts are critical to a person's ability to develop professional competence in vocational training and therefore to integrate into and shape wider society as a professional (Baethge et al. 2006; Deißinger 1998).

To support this assertion, we set out several theoretical considerations and outline the concept of vocational competence for apprentices in commercial domains. Vocational competence in the commercial domain involves more than just mastery of commercial abilities; it is a broader notion that includes critical, specific abilities, as well as literacy and numeracy as they arise in economic settings and situations. Thus, we identify domain-specific and domain-linked components of vocational competence in commercial domains. We seek both to frame what we already know about domain-specific and domain-linked (in particular, economic literacy and numeracy) competence and to define what we do not know yet.

In turn, we identify the contents of the commercial domain as a baseline and foundation for designing instruments and diagnostic measures that can test individual abilities associated with commercial and economic requirements. We conceptually delineate the importance of economic literacy and numeracy for the acquisition of domain-specific vocational competence (in contrast to Walstad et al. 2013), using a curricular perspective. We also examine the quantitative, empirical extent to which domain-linked competence (including economic literacy and numeracy) relates to the development of domain-specific competence, using item response theory (IRT) and an analysis of latent correlations. The IRT models enable us to illustrate task diffi-

culty and characteristic values (e.g., individual ability) on a common scale. We apply these well-supported methods in a computer-based test environment to a sample of 468 industrial apprentices.[1]

7.2 Theoretical Conception of Vocational Competence

We define competence, in line with Mulder et al. (2006), as the capability to perform by using knowledge, skills, and attitudes integrated in the professional repertoire of the individual. It is therefore reasonable to deduce cognitive structures from the solution of tasks in authentic situations (performance), assuming adequate item design and psychometric procedures (Chomsky 1965; Shavelson 2008; Wilson 2008). This definition emphasizes that both ability and attitudes are necessary to perform successfully in vocational situations. For this contribution though, we specifically consider knowledge and ability, not attitude-related aspects of vocational competence in terms of motivation and volition. The starting point for our analysis of competencies in vocational education and training (VET) in commercial and economic domains is the assumption that apprentices, at the beginning of their training period, are not simply blank slates. They have undergone a minimum of nine years in school, gathering different experiences and acquiring diverse generic competences, such as literacy, numeracy, and problem solving. Differences in their prior training render young adults unequally prepared to cope with the affordances of work life, such that together they constitute a heterogeneous group of learners (Seeber 2010). Although we lack a consistent picture of prior vocational knowledge, growing evidence indicates that individual differences in mathematical and verbal abilities can predict vocational competence, at least in some professions (Lehmann & Seeber 2007; Nickolaus et al. 2008; Rosendahl & Straka 2011; Seeber 2013), such that they might be regarded as keys to competence development in those professions. Beyond general competences, during VET, apprentices undergo processes of enculturation that integrate them into a community of practice (Lave & Wenger 1991). Through these processes, they acquire a body of knowledge and ability that is specific to the occupational domain or trade they plan to enter, such that it can be referred to as domain-specific.

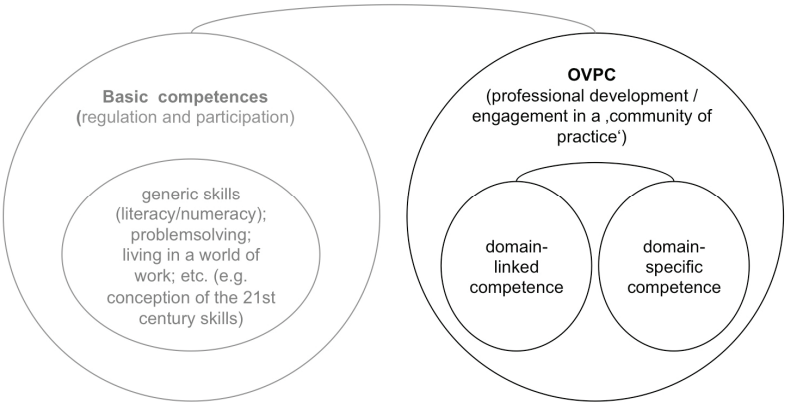
A theoretical framework that includes and connects both of these aspects of vocational competence—that is, a domain-linked general notion of competence and a domain-specific notion of competence—is available from

1 These data were obtained from the pilot study of the research project CoBALIT (Competencies in the Field of Business and Administration – Learning, Instruction, and Transition), funded by the German Federal Ministry of Education and Research (BMBF).

Gelman and Greeno (1989). For these authors, the domain-linked category refers to the notion of key vocational abilities, such as knowledge that is general but relevant for solving vocational or professional problems. In economic domains, concepts such as literacy and numeracy have long been discussed as manifestations of non-situational prior knowledge (OECD 2003; Winther & Achtenhagen 2009). Domain-specific competence instead involves occupation-specific contents and job- and enterprise-specific rules and abilities (Oates 2004) that are highly situated. Within Gelman and Greeno's (1989) framework, the domain-linked competences are the fertile soil for growing domain-specific competences, as well as integral elements of the vocational domain itself. Both competence dimensions influence each other, yet their relationship requires further exploration and can be seen as a research desideratum.

The integrative competence model shown in Figure 1 (Winther 2010; Winther et al. 2013) thrives on this distinction and accommodates the connections between basic and vocational competences in the profession, thereby combining the aims of social affiliation and professional development. Basic competences, which should facilitate some kind of social affiliation, include generic abilities, such as reading, writing, calculating, and problem solving as well as work capabilities like being able to work as a team. These basic competences ground the learning processes during an apprenticeship; they are independent of any specific domain. In contrast, economic literacy and numeracy refer particularly to the aspects of basic economic knowledge and abilities that are relevant for commercial and economic domains. These domain-linked aspects of vocational competence should have been acquired in the general school system, before students start an apprenticeship. Finally, domain-specific competences are more likely to be acquired during VET. The development of vocational competence is an ongoing process, through which domain-linked competences become more integrated with domain-specific competences (Sträßer 1996; Winther 2010). But both domain-linked and domain-specific competences are part of vocational competence. This assumption then raises a question: Is it most appropriate to (1) interpret domain-linked and domain-specific competence as two different competences; (2) predict that their integration, at an advanced stage, transforms them into one competence with two dimensions; or (3) collapse the domain-linked and domain-specific competence aspects into one integrated dimension?

Figure 1: Model of occupational, vocational, and professional competence (OVPC) during vocational education and training in the economic domain



7.3 Analysis of Contents in the Commercial Domain: Baseline for Item and Test Development

We designed an assessment to measure commercial competence, based on domain-linked and domain-specific tasks, within the scope of a computer-based test environment, namely, a simulated company that produces rolled aluminum products such as beverage cans (Achtenhagen and Winther 2014; Winther 2010). Our instrument is intended to be authentic, in terms of occupational situations, and appropriate, with respect to abilities acquired through vocational training. Within this simulated environment, tasks of varying levels of difficulty and different cognitive demands in distinct content areas were implemented.

As part of the preliminary studies, we conducted 31 guided interviews with (a) VET instructors in five enterprises and (b) teachers in four vocational business schools to identify essential occupational tasks through a qualitative content analysis. The job analysis was guided by several questions: What content is processed in which departments? What materials are used? How does internal/external communication take place (infrastructure)? Moreover, we examined curricula, training regulations, and textbooks to find typical tasks and content. All results and information were incorporated into the development of the domain-specific and domain-linked tasks.

The domain-specific area reflects value-added processes that occur within companies. Recent changes suggest the increasing importance of process structures, in the sense that the design of corporate processes has eclipsed classical organizational structures (Rüegg-Stürm 2004). We used this process perspective, as characterized by the St. Galler Management Model (Rüegg-Stürm 2004), to describe our specific business processes and tasks, as shown in Figure 2, and also tap linguistic and mathematical aspects.

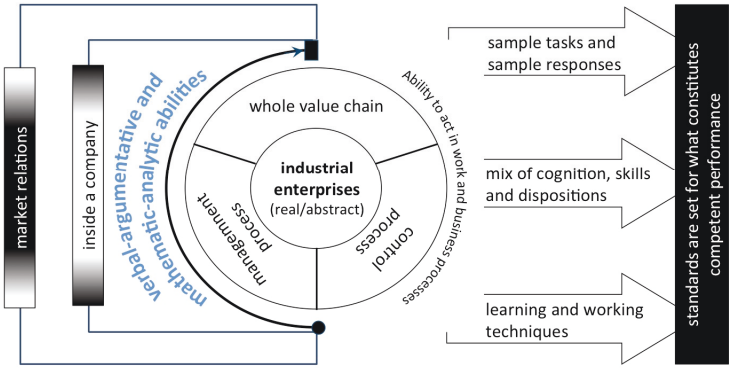


Figure 2: Business processes for identifying learning and work requirements (Winther 2010: 88)

Figure 2 contains three central processes in (industrial) companies: (1) value chain processes, related to quantifiable goods and services and their marketing; (2) control processes, including decision support for management; and (3) management processes that comprise business management and organization concerns (see Winther 2010: 88ff). The model represents the company as a complex system and enables the assignment of all tasks (including those of industrial clerks) that occur in a company. Therefore, it covers the whole commercial domain. The focus of the tasks reflects the range of value chain processes, including purchasing, sales & distribution, communications & marketing, and production planning & control. More strategic tasks in the field of management processes were used only partially. Accounting and controlling has been excluded previously.

From the processes, a conception about what constitutes competent performance can be derived, by

(1) observing sample tasks and sample responses to determine which tasks are typically performed in which manner in organizations.
(2) analyzing the mix of abilities that reflect the knowledge and skills required for task performance.
(3) observing learning and working techniques, which reveal typical techniques and methods for performing a task. This effort, in the commercial sector, includes the use of computers in general and software programs in particular (e.g., enterprise resource planning).

In practice, a typical item for a value chain process is a request for a quotation. In our test environment, we thus included the following example situation: Because of a takeover, a customer needs a new colored company logo. The preferred color is out of stock, so the learner must submit a request to produce the order. Analyzing sales volumes and profit margins instead represent control processes. For example, the learner must read and analyze charts from different customer groups or compare products based on a breakeven analysis. Finally, items in the field of management processes are relatively rare in the test environment, because they often exceed the level of expertise required of trainees and are not part of their usual tasks. Choosing a new supplier based on various data or benchmark tests, for example, is a task that reflects this more strategic perspective, which would require the learner to consider both quantitative and qualitative information while assessing multiple documents, such as offers and references.

From this initial insight into appropriate descriptions of the domain-specific scope, we move on to the domain-linked perspective. The focus is on basic linguistic and math abilities in economic contexts. In international discourse, we find different approaches and concepts that seek to capture something like basic abilities, the ability to work, everyday working life, or general adult competencies; most of them include linguistic and math abilities. Sometimes literacy is regarded as a comprehensive or broad concept in terms of basic abilities, such that it includes mathematical aspects as well (e.g., Adult Literacy and Lifeskills Survey (ALL), the International Adult Literacy Survey (IALS), and the OECD's Programme for the International Assessment of Adult Competencies (PIAAC); Level-One Studie (leo); Barton, D. & Hamilton, M. (1998)).

To test cross-cutting cognitive abilities, the test environment must feature authentic, economic-related documents that need to be understood, interpreted, and analyzed, using basic abilities. A price comparison (currency translation) offers a good example. To complete this task, learners would need to apply the rule-of-three, which is a basic mathematical ability they should have learned already in school; it is a domain-linked numeracy competence. Then the learner must read documents, such as service catalogs or e-mails, to complete the work. Economic literacy is manifested explicitly

when, among other examples, a newspaper article provides certain information that the test subject needs to obtain (e.g., reasons for earnings growth).

The boundary between domain-linked items and domain-specific items is not absolute or consistently clear-cut, so it often cannot be determined clearly. There are also questions about the extent to which the context influences basic abilities and what constitutes common economic ability or requires specific training. Mathematical and linguistic abilities, as essential facets of domain-linked competencies, can be described in more detail, for which purpose we use established competence models. As we have noted, linguistic and mathematical aspects do not need to be approached separately or out of context; rather, they can be linked mainly to specific (professional) contents and integrated accordingly.

With respect to literacy, we follow large-scale assessments such as PIAAC (OECD 2013: 59) or PISA (Klieme et al. 2010) and distinguish different textual formats, such as continuous (normal texts) and non-continuous (image representations) formats. In reading situations, a significant difference arises between reading literacy in the vocational versus general educational domains; the competence measure for this study addresses a professional competence to act, so reading literacy must be clearly attributed to the vocational context. Few research results are available that focus specifically on the vocational context, and suitable test instruments to assess reading competence are scarce (Ziegler et al. 2012). For economic literacy, we consider tasks that require reading, writing, oral, and written communication abilities and also address the handling of specific text formats (e.g., legal texts) and (written) communications (e.g., formal request for a quote, customer complaint). The different text formats must be searched for information by the apprentices, who must comprehend and apply professional linguistic styles and specific terminology. The tasks in our proposed pilot study can be completed only if students have acquired fundamental reading abilities; all tasks thus have some literacy aspect. Comprehension-oriented reading is also a prerequisite in everyday working life, as a basic competence for task performance (Petsch et al. 2008: 1). However, our test measures not just comprehensive reading but also the capacity to act, as a further step.

The large-scale studies, such as PISA or PIAAC, also offer extensive descriptions of math abilities. In contrast, the IALS's "quantitative literacy" items represent only a subset of PISA's mathematic approach (Jordan 2011: 86). For this study, economic numeracy is included in all tasks that entail a mathematical or analytical approach to domain-linked job requirements (Winther 2010: 171). Basic arithmetic operations, fractional arithmetic, and calculations of percentages are all aspects frequently applied in vocational education (for an overview, see Jordan 2011: 61ff.). However, mathematical competences in the commercial domain span relatively restricted content, at a

low competence level compared with PISA standards (see Winther et al. 2013). The action-oriented authentic items integrate components of relevant subject domains beyond mathematics, such that they reflect a complex structure of competences required for professional practice (Winther et al. 2013). In our case, the primary objective is not to test general reading ability or math ability but rather to determine if learners can resolve and function in professional situations by applying these general abilities.

In summary, we anticipate that commercial competence can be represented by two constructs: domain-specific and domain-linked. To describe domain-specific competences, we focus on internal business processes. Domain-linked competencies can be described with a broad literacy approach that includes different types of basic abilities, including economic numeracy and economic literacy, for managing occupational settings using mathematic and linguistic abilities.

7.4 Empirical Modeling of Domain-linked and Domain-specific Competence

In 2013, we conducted a study to apply our technology-based test environment (see section 2) and implemented 31 items to capture the domain-linked (dl) and 36 items to capture the domain-specific (ds) competences of apprentices in an economic domain: 11 items pertained to the area of production planning (4 dl, 7 ds), 11 items to purchasing (3 dl, 8 ds), 31 items to communications & marketing (18 dl, 13 ds) and 14 items to sales & distribution (6 dl, 8 ds). Each domain-linked item has a mathematical or linguistic focus, as assigned by us.

The data were obtained from vocational learners in eight different vocational schools in three federal states of Germany (North Rhine-Westphalia, Hesse, and Lower Saxony). The sample consisted of 468 industrial clerks in the second or third year of their apprenticeships, 41% of whom were women and 59% men. The test took approximately 240 minutes, including a 10-minute introduction and the completion of a questionnaire that took around 40 minutes (e.g., contextual information, test motivation). The items in the ALUSIM test environment reflect three central processes in companies (see Figure 2): (1) value chain processes, (2) control processes, and (3) management processes. We used 20 booklets in a cluster rotation design, reflecting the four main commercial areas (production planning, purchasing, communication & marketing, sales & distribution). We rotated the item blocks to reduce the effects of exhaustion and ensure comparable data for every task, even if the apprentices did not manage to finish the test.

In the empirical part, we sought to answer the following research questions:

1. Which model is visible in the data structure: (a) two different competences, domain-linked and domain-specific; (b) one competence with domain-linked and domain-specific dimensions; or (c) one competence with one integrated dimension?

In addition, we included one random model, created purely coincidentally without any theoretical basis, to test if the results from the two-dimensional analysis might be due to chance (i.e., random model; Wu and Adams 2006).

2. How strong is the interrelation between domain-linked and domain-specific competences?

To empirically test the separability of domain-linked and domain-specific competences, we conducted confirmatory IRT-based structural analyses. With this model, we then assessed the correlation between the two dimensions, as an indicator of their separability and their interrelation. A one-dimensional Rasch analysis with 67 items relied on the random coefficient multinominal logit model (Adams et al. 1997), within ConQuest (Wu et al. 1998). In more detail, we used an extension of the Rasch (1960) model, the partial credit model (Masters 1982).

Five items revealed poor unweighted fit *t*-values, but no item showed poor weighted fit *t*-values (> 3.0 or < -3.0) (Wright and Masters 1982), so the items did not all fit a one-dimensional scale (Wu & Adams 2006: 104). To uncover the dimensionality in the data, we fit a general form of the multidimensional random coefficient multinominal logit model (Adams et al. 1997), with between-item dimensionality. For a clarification of the better model, we compared the relative fit of the two models, according to the deviances obtained from fitting both models. The deviance indicated a superior model (Wu & Adams 2006: 104).

As Table 1 shows, the two-dimensional model fits the data better than the one-dimensional model, with a significantly smaller deviance. Therefore, the two-dimensional model represented the structure of the item response data more appropriately. The estimated latent correlation between the two dimensions amounted to .84, indicating the separability of domain-linked and domain-specific competences as well.

To test if the results from the two-dimensional analysis might be due to chance, we also ran a two-dimensional model in which we allocated the items to the dimensions arbitrarily (i.e. random model; Wu & Adams 2006). That is, items with uneven numbers were assigned to the domain-linked dimension, and items with even numbers were assigned to the domain-specific dimension. The deviance in this analysis was 17965.8, so the one-dimensional model fits as well as the two-dimensional model with random item assignment. The latent correlation ($r = .98$) between the dimensions confirms that the dimensions are not distinguishable in the random model.

Table 1: Fit comparison of one- and two-dimensional models

Model	Deviance	Number of Parameters	Change in Deviance	Degrees of Freedom	*p* (sig.)
1-Dimension	17967.1	90	-	-	-
2-Dimension (theory-based)	17942.8	92	24.3	2	$p < .005$
2-Dimension (random model)	17965.8	92	1.3	2	*n.s.*

Although the IRT calculations give no generally valid values or overall test for model quality, we can compare the different models based on information criteria (Table 2). Low values signal better model fit, confirming the theoretical two-dimensional model.

Table 2: Pattern quality on the basis of BIC, AIC and cAIC model

	Bayesian information criterion	Akaike information criterion	Constant Akaike information criterion
1-Dimension	18520,46	18147,10	18190,55
2-Dimension (theory-based)	18508,46	18126,80	18172,43
2-Dimension (random model)	18531,46	18149,80	18195,43

In Table 3, the EAP/PV values for both dimensions are sufficient, but the WLE values do not reach an adequate level in the two-dimensional model. In the one-dimensional model, the EAP/PV scale reliability (.74) and the WLE person separation reliability (.71) values both meet eligibility criteria. Therefore, conclusions on the individual level should be limited to the comprehensive test. To make decisions on a dimensional level, we would need to create additional items to improve the reliability of the two dimensions.

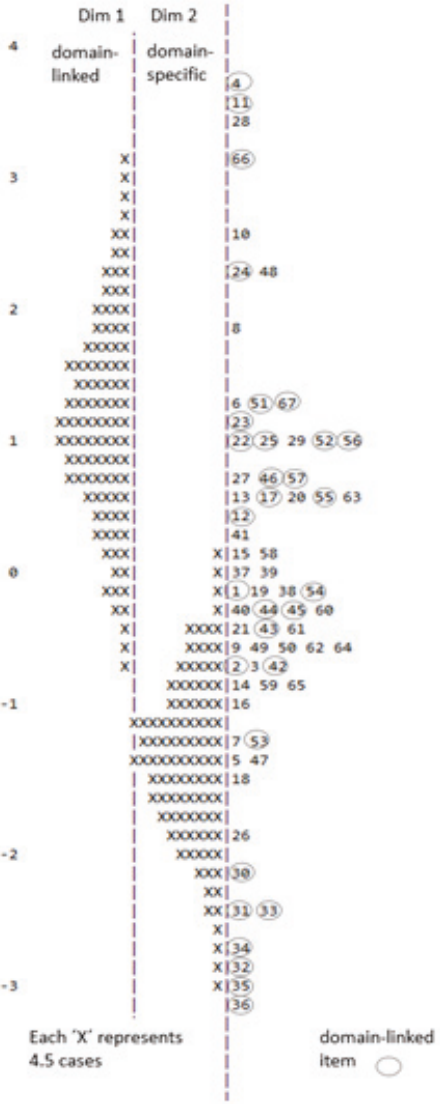
Table 3: Correlations, EAP/PVs, and WLEs for the two-dimensional model

Two-Dimensional Model	1.	2.	EAP/PV	WLE
1. Domain-linked economic competence	1		.69	.49
2. Domain-specific economic competence	.84	1.	.70	.54

With Figure 3, we illustrate the difficulty of the items (item numbers) and the capability of the individual learners (x) on the two dimensions. Domain-linked items (dimension 1) are highlighted by circles, which reveal the balanced distribution of very easy items (negative logit values) and very difficult

items (positive logit values) for the global test. In particular for the domain-specific dimension there should be more easy items.

Figure 3: Wright map for domain-linked (dimension 1, items highlighted) and domain-specific (dimension 2) economic competences



7.5 Conclusions

This study has sought to identify the relation between domain-linked and domain-specific competences. As a first theoretical finding, we show that domain-linked abilities, such as literacy and numeracy, have an integral role in mastering commercial and economic situations in the workplace. They even can be considered part of the economic domain in themselves (Gelman & Greeno 1989). As such, they can be modeled as a discrete baseline dimension over curricular contents of the commercial domain, apart from domain-specific competence (Winther & Achtenhagen 2009). For our ALUSIM test environment, we modeled domain-specific tasks that reflected typical business processes in the workplace. With respect to domain-linked competences, we developed literacy and numeracy tasks, which are relevant and typical for the economic domain but do not require VET to be solved. Referring back to research question 1, we find that commercial competence can be empirically distinguished into two dimensions, domain-linked and domain-specific competence.

We used an empirical structure analysis to determine that it is possible to conceptualize vocational competence with domain-linked and domain-specific components ($p < .001$). The two dimensions constitute separate but highly related concepts, with a latent correlation of $r = .84$. This strong cognitive cross-linking, as a distinct feature of professional development, becomes especially apparent in our integrated test design. The results support theories of enculturation and models that depict professional development as an ongoing process, in which domain-linked competence becomes more integrated into the domain-specific competences acquired through communities of practice (Klotz & Winther 2015; Lave & Wenger 1991; Sträßer 1996).

Despite a broad scale construction that featured sufficient, easy and difficult tasks for both dimensions, we found that domain-linked items were easier to solve than items that required specific occupational activity, which suggests a different quality of vocational competence (i.e. rules of practice). This quality of domain-specific competence remains unknown to some extent, premised on domain-linked competence. With our cross-sectional research design, we could only assess their common interrelation, not the degree to which domain-linked competence predicts the development of domain-specific competence. Further research is required to address this shortcoming and model the order of competence development. Another shortcoming of the test instrument is the very long test time (four hours). We dealt with this problem by using a rotational testlet design. However, it might have influenced respondents' overall test motivation. Finally, it remains to be seen if and to what extent the results are generalizable to other vocational domains.

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8 Opportunity Recognition as Part of Intrapreneurship Competence – An Analysis of Exam Essays of German Industrial Clerks

Christine Weiß and Susanne Weber

8.1 Introduction

Due to the megatrends which are seen as permanent and serious changes within political and socio-economic contexts, work place requirements changed fundamentally in the last decades (Buttler 1992: 164; 2009; McGaw, Care & Griffin 2012: V). Therefore, the ability to innovate in an increasingly globalized world has become a decisive competitive factor for enterprises of all branches. Companies are realizing that these potentials are less generated at an enterprise level than at the level of individuals whose independent and creative thinking is increasingly demanded and have, therefore, to be supported (Pinchot 1985: 11; Borza & Maier 2012: 14; Wunderer 1999: 23). Consequently, the employees' innovation orientation and ability become a decisive predictor for the continuous success of enterprises (Antoncic & Hisrich 2001: 496; Kuratko, Ireland & Hornsby 2001: 60; Zahra 1991: 260). This gets more and more obvious when looking at corporate mission statements (Wunderer 1999: 38). For example, a large car producer claims for unconventional ideas under the heading of "thinking and shaping the organization". Its employees should generate corresponding ideas and are encouraged to introduce them without fear. Accompanying those behavior patterns is the increasing focus on project work, inter-divisional working processes as well as interdisciplinary teamwork so that the classical image – as well as the tasks – of a commercial employee seems outdated (Lutz 2000: 73–74). In fact, job profiles changed insofar that they are especially focusing on creativity and innovation abilities besides problem-solving and critical thinking (Binkley et al. 2012: 18). The collection of so-called 21st Century Skills presents the formal frame for these abilities claiming to formalize the skills that are needed to become a successful member of society in private life as well as at work in a knowledge focused world (Ananiadou & Claro 2009: 8). These knowledge, skills and attitudes are also gaining more attention in vocational education and training (VET). Within the last years, they were integrated explicitly in the German school curricula and training regulations for companies in VET so they became mandatory for the whole system of Dual Apprenticeship. This shows special political attention to the fields of VET.

Following the conviction that intrapreneurship (understood as entrepreneurship within an existing organization) can be effectively and efficiently taught and learned, the need to systematically develop and promote those occupational competencies is pushed further. A central concern at this point is that apprentices are enabled to shape their careers within and outside of organizations in an independent manner (Ebner, Korunka, Frank & Lueger 2008: 293).

In addition, there is a re-orientation in VET. The input orientation and, therefore, the focus on input factors like budget or other resources is revised for an output orientation. This includes the focus on output or outcome variables like competencies learned and shown at the end of a course. That is the main reason why modeling and measuring of competencies in VET is a central concern of educational research.

Furthermore, to enable decisions on different levels of the educational and employment system, assessment in general aims for qualitative and quantitative statements on the knowledge, skills and attitudes of participants (Seeber & Nickolaus 2010: 251; Klieme & Leutner 2006: 2). Therefore, knowledge of successful diagnostic measures as well as an adequate promotion of occupational competencies is needed. To underline the relevance of intrapreneurship more research on this topic is needed. Especially modeling and measuring Opportunity Recognition behavior as the essential starting point of innovative ideas on an individual level has to be fostered.

As seen before Opportunity Recognition is an important topic that is also discussed within the field of vocational education. Additionally, it is already part of German VET programs and implemented within vocational schools and apprenticing companies. That is why this paper focuses on Opportunity Recognition shown by German industrial clerks at the end of their apprenticeship. As this VET program is one of the most favorite in the German commercial sector it seems reasonable to choose this occupation for research in this field (BMBF: Berufsbildungsbericht 2014: 22). Within this training program intrapreneurship is already codified in the curricula of both learning places – vocational schools and companies.

The central concern of this paper is the development and validation of an instrument that helps identifying Opportunity Recognition behavior patterns. Therefore, we firstly discuss intrapreneurship (IP) competence in general and Opportunity Recognition (OR) patterns in particular. This paper exceeds former analyses of the ASCOT-research group of Weber on intrapreneurship competence (Weber et al., 2015) by zooming just into Opportunity Recognition behavior and analyzing this particular competence facet in more detail. The theoretical discussion ends up with a model of Opportunity Recognition within intrapreneurship. Secondly, three research questions are raised and methods used to answer them are presented. Thirdly, results and their interpretation are reported. Here, we can show that the theoretically developed

instrument – which aims at operationalizing competencies and tries to identify modes of OR behavior – could be successfully tested. Fourthly, we will discuss impacts and prospects for further promoting intrapreneurship in general and Opportunity Recognition in particular in German commercial VET programs. The paper presents – at least to the knowledge of the authors – a first systematic approach to the domain of Opportunity Recognition within VET programs.

8.2 Concepts of Intrapreneurship and Opportunity Recognition

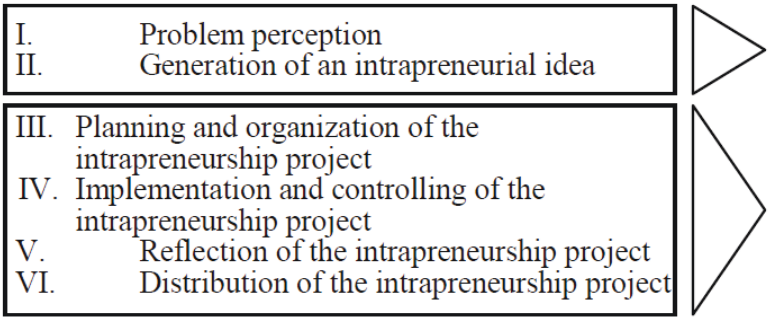
8.2.1 Intrapreneurship in general

In general, an intrapreneur is seen as an entrepreneur within an organization (Antoncic & Hisrich 2001: 497). Until there is no consensual definition of intrapreneurship (Draeger-Ernst 2003: 26). Pinchot (1988: 10) created the term intrapreneur out of the concepts intracorporate and entrepreneuring. He was the first who defined the term and especially the behavior patterns more precisely and, therefore, shaped it fundamentally down to this day. There are three ways to differentiate the research approaches within scientific literature: (1) *number of individuals involved*, (2) *level of analysis* and (3) *degree of innovation*. Looking at the first category *number of individuals involved* there are two understandings: (ad 1) (1a) the *elitist* understanding so that only a few people in a company would be able to be an intrapreneur and, therefore, able to generate and implement successfully innovative ideas (Pinchot 1988: 7). In contrast, Wunderer (1999) formulates (1b) the *broad* approach to promote intrapreneurial behavior patterns among a lot of employees at the same time. Furthermore, it is claimed in literature that those behavior patterns can be taught and learned (cf. Drucker 1985: 221). Another point of distinction is the (ad 2) *level of analysis*. Approaches on (2a) the *organizational level* look at variables such as an innovative climate, small bureaucracy, as well as monetary incentives that allow the successful promotion of intrapreneurship (Draeger-Ernst 2003: 26). At (2b) the *individual level* it is about knowledge and skills that allow for intrapreneurship whereas in former research especially attitudes (e.g., performance orientation, need for achievement or innovation orientation) were investigated (Ebner et al. 2008: 294). Finally, there is a differentiation for the (ad 3) *degree of innovation*: (3a) *radical* vs. (3b) *incremental* respectively discontinuous vs. continuous innovations (Draeger-Ernst 2003: 25). The difference between these two forms can be found in the need for new organizational structures. Whereas radical

innovations need newly created organizational structures and are rare to find, incremental innovations can be implemented within given structures and are more common (Draeger-Ernst 2003: 25; Casson 1982: 25). A classic example for a radical innovation is a newly founded venture to introduce a completely new product on the market. In contrast, an adaptation of an existing product is seen as an incremental innovation. It is important to notice that not only products but also organizational processes can be an issue of innovation. All approaches have in common that the innovation has to be new for a specific enterprise solely; it does not have to be new for a complete branch (Schönebeck 2010: 21; Draeger-Ernst 2003: 45).

Summing up this state of the art we define IP in accordance to Perlman, Gueths and Weber (1988: 14) as "a process by which a person meets his or her needs for autonomy, invention, management and completion of projects in a complex bureaucracy". This definition is taken as working definition for this paper. An approach with a broad understanding (ad 1b) on the individual level (ad 2b) of intrapreneurship is applied. In this context incremental innovativeness (ad 3b) is seen as a result of intrapreneurial thinking and acting.

Figure 1: Intrapreneurship competence model for German industrial clerks at the end of their VET program (Weber et al. 2014: 288)



8.2.2 Intrapreneurship within vocational education and training

This understanding of intrapreneurship emerges out of an extensive domain analysis, which included analyses of school books, observation of school projects and their documentations as learning processes and outputs as well as from research papers (Weber, Trost, Wiethe-Körprich, Weiß & Achtenhagen 2014). For enhancing further ecological validity an analysis of job advertisements for industrial clerks directly after their VET degree was run (Trost & Weber 2012). As a result a competence model was formulated (Figure 1).

Weber et al. (2014: 288) postulate a model by which intrapreneurship can be differentiated into six facets. The behavior patterns "I. Problem perception" and "II. Generation of an intrapreneurial idea" are aggregated as *Opportunity Recognition*. In contrast, *Opportunity Realization* is understood as the remaining four facets of planning, implementation, reflection and distribution of the intrapreneurship project. This aggregation follows assumptions of Pinchot (1987: 14) as well as Arif, Zubair and Manzoor (2012: 65). Although the design proposes a cyclical process, in reality there are many iterative sequences that do not follow a mandatory cycle. For example, although the implementation of the intrapreneurship project is taking place there are possible disturbances which require new information. But formally the information gathering process itself is part of the planning and organization processes. Furthermore, the foundation of intrapreneurship is at the same time the differentiation feature to classical project management: When thinking of intrapreneurship there is a new or recombination of resources due to the generation of something new and the aim of additional profit for the organization (Lumpkin 2007: 136). Therefore, an at least incremental innovation is mandatory to think of a project as intrapreneurial. As a result Opportunity Recognition patterns are mandatory not only for innovations themselves but also for the understanding of intrapreneurship. Former theoretical analyses of Opportunity Recognition focused on entrepreneurship (e.g., Short, Ketchen, Shook & Ireland 2010), but the possibility of adaptation to intrapreneurship can be assumed and is reasonable (Antoncic & Hisrich 2001: 297).

8.2.3 Opportunities and the process of their recognition

To think further of Opportunity Recognition in particular it is firstly needed to develop an understanding of the phenomenon "opportunity". In a business context an opportunity is seen as something innovative that meets the needs of the market and enables additional revenue (Casson 1982: 25; Schumpeter 1950: 100; Kirzner 1979: 11; Gaglio 2004: 534; Ardichvili, Cardozo & Ray 2003: 108; Short et al. 2010: 55). It can, therefore, refer to different areas of the business (e.g., processes, products or markets; Gaglio 2004: 108). The concept of opportunities has to be differentiated from the concept of ideas. Ideas are in most cases the foundation of intrapreneurial opportunities but do not have a stand-alone value (Pinchot 1988: 7; Short et al. 2010: 54). Furthermore, literature distinguishes two ways of developing opportunities: (a) the *discovery* and (b) the *creation* of opportunities (Short et al. 2010: 55). (ad a) The *discovery* approach thinks of external factors like the megatrends causing opportunities that have to be discovered (actively or passively) by the intrapreneur (Kirzner 1979: 7–8). This process includes the possibility of incremental innovations (Draeger-Ernst 2003: 25; Casson 1982: 25). In this

understanding "opportunities exist out there waiting to be found" (Short et al. 2010: 54). (ad b) The *creation* approach speaks of a whole new formation of opportunities for innovation (Murphy 2011: 367–369; Schumpeter 1950: 100; Ardichvili et al. 2003: 106). At this point innovations destroy market equilibria and, therefore, can be seen as radically innovative (Brülhart 2010: 260; Draeger-Ernst 2003: 25). Thus "opportunities are made, not found" as Ardichvili et al. (2003: 106) state. There is a third approach that is more moderate saying that "some opportunities are discovered whereas others are created" (Short et al. 2010: 54). In principle, this paper is based on the first approach. Looking at the context of VET it is important to assume the possibility of being able to learn the recognition of opportunities. That is why the trend within this paper is directed towards the discovery approach; in this case, literature suggests such learnability (Baron 2006: 106).

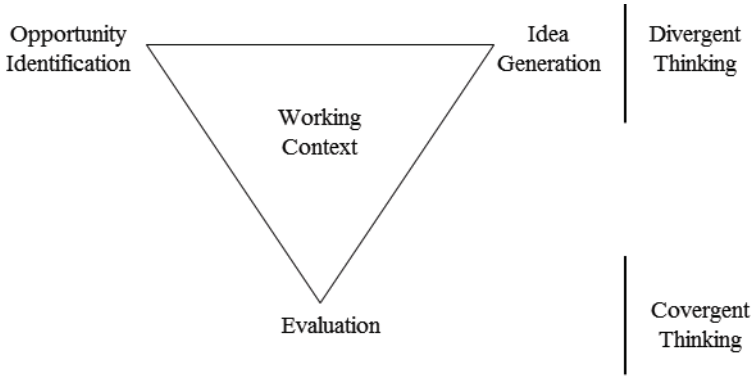
Referring to this understanding of opportunities there is a wide range of Opportunity Recognition literature throughout the time. Looking at the conceptualization of this phenomenon there are manifold models. Analyzing the research, creativity especially in the sense of problem sensitivity seems to be mandatory for the Opportunity Recognition process (Häcker & Stapf 1998: 468). Guilford (1967: 453) as one of the first researchers looking systematically at this process already includes divergent thinking which enables creative thoughts within his model and also conceptualizes problem sensitivity as first stage in his model. His focus lays on different thinking characteristics including fluency and originality that allow for innovative problem solutions (Brown 1989: 14). Furthermore, his model looks at creativity in general and has, therefore, no domain-specific focus. Because of difficulties in reliable and valid testing there are some concerns on those divergent thinking and cognitive models (Brown 1989: 21–22). Thus, other authors concentrated on factors like motivation and personality (Brown 1989: 26). In this context, an important model was formulated by Amabile (1983: 362, 367): it considers the factors task motivation (attitudes, perception of own motivation), creativity-relevant skills (e.g., cognitive style, conductive work style) and domain-relevant skills (e.g., domain knowledge, technical skills). Those factors influence Opportunity Recognition and, therefore, creative problem solving processes (Amabile 1983: 367). Besides some shortcomings – especially with regard to the linearity of the model and other features (e.g., the influence of the components of creativity is declared to be only on special steps) – Amabile's model builds the foundation of a rich research area focusing on external and internal factors influencing intrapreneurship and OR in the widest sense (Brown 1989: 28). Approaches considering primarily context factors do not focus explicitly on skills for finding innovative problem solutions. Another model which focuses more on psychological processes within work contexts is presented by Schuler and Görlich (2007). Within their eight-stage process model they emphasize the importance of

creativity; beginning with the problem identification step (2007: 30). The conceptualization bases on theoretical and empirical findings (Winzen 2009a: 177). Meanwhile, the model implies that not all conceptualized steps have to be shown to generate a successful problem solution and that the whole process can be iterative (Winzen 2009b: 21). The constructed test is at least in parts empirically confirmed (Winzen 2009b: 172, 175). The constraint lies in the target group of measurement. It is addressed at young professionals with higher education entrance qualification and is, therefore, not explicitly constructed for the context of VET (Winzen 2009b: 100). A last model that is discussed here is presented by Ardichvili et al. (2003). They present an integrative approach that includes antecedences (e.g., personality traits, prior knowledge) as well as the process of Opportunity Recognition (Ardichvili et al. 2003: 118, 121). The process itself is three-staged and includes again problem sensitivity in the broadest sense as well as the creation of an innovative problem solution – also throughout iterative processes (Ardichvili et al. 2003: 109, 118). Overall, this model focuses on the creation of new ventures and organizations (also within existing enterprises) and therefore does not include e.g., process innovations or incrementally innovative problem solutions (Ardichvili et al. 2003: 119).

8.2.4 Opportunity Recognition in the context of vocational education and training

Integrating the presented models into the VET context, we built our Opportunity Recognition model on theoretical and empirical considerations: We included the assumption of two thinking styles of Guilford (1950: 453) as well as Barron and Harrington (1981: 443): divergent and convergent thinking. Here, divergent thinking represents open minded thinking with a broad focus while convergent thinking makes the produced thoughts concrete and, therefore, evaluates them (Luecke 2003: 86). Furthermore, Amabile's (1983) assumption of domain specificity in general and domain-specific skills in particular as prerequisite for creativity is used to satisfy the demand for context-specific assessment looking explicitly at learning outcomes in VET (Winther 2010: 79, 199; Pellegrino 2009: 6). Using the model of Schuler and Görlich (2007) enables a direct transfer to the working context. Hereby, the three general iterative components formulated by Ardichvili et al. (2003) build the schematic foundation. The connection of these four models is demonstrated by Figure 2.

Figure 2: Connection of the models used to conceptualize Opportunity Recognition for VET – Schematic presentation



The competence model for Opportunity Recognition of apprentices at the end of their VET is formulated as a three-stage model. Furthermore, it is developed according to the evidence-centered assessment design (ECD)-approach of Mislevy and Riconscente (2005). The main assumption of this approach is that one cannot directly look at the trainees' knowledge, skills and attitudes. The only way to assess is, therefore, a process of reasoning from evidence that means the evaluation of the behavior shown (Mislevy, Almond & Lukas 2003: 3; Mislevy & Riconscente 2005: 2; Pellegrino 2009: 6). The approach postulates a hierarchical development cycle where the assessment triangle forms the basis (Pellegrino, Chudowsky & Glaser 2001). This triangle integrates three domains of successful learning: The cognition describes how the domain is structured and which concepts help to learn (Pellegrino 2009: 6). Within the observation possible learning outcomes are discussed where the interpretation gives hints of how to evaluate these learning outcomes (Pellegrino 2009: 7). In accordance with the ECD a domain analysis is the starting point for modeling competencies. By this step the domain of interest is analyzed. At this point the content of the domain as well as what and how to learn is looked at (Mislevy & Haertel 2006: 8). The learners' knowledge, skills and attitudes are focused on afterwards within the domain modeling process (Mislevy & Haertel 2006: 8). Here, possible work outputs and potential observations are shown. The result of these first two steps is the formulation of the competence model. This is the base for the following steps of designing a conceptual framework, the implementation as well as delivery of assessment (Mislevy & Haertel 2006: 8). The following research assumptions are situated at the end of the first two steps of domain analysis and domain modeling while trying to validate the developed competence model.

The three stages of the model show an increasing level of operationalization. The evidences on level three enable a direct observation of behavior and, therefore, conclusions about the mental processes underlying that behavior which cannot be directly observed are possible. This corresponds to the demands of the ECD (Mislevy, Almond & Lukas 2003: 3; Mislevy & Riconscente 2005: 2; Pellegrino 2009: 6). Table 1 presents an extract of the competence model to illustrate the description processes.
For the competence model the level 3 "evidences" represent the final level of operationalization and can be translated directly into an item format (Pellegrino, DiBello, & Brophy 2014: 577).
Overall, the paper tries to contribute to the modeling and measuring of a specific occupational competence namely Opportunity Recognition as part of intrapreneurship in the field of VET. Therefore, the presented model will be tested and the results discussed in the following.

8.3 Research Questions and Methods

8.3.1 Research questions

To reach the above research goal the following research questions are asked:

RQ1: How do the Opportunity Recognition behavior patterns of industrial clerk apprentices at the end of their VET program look like qualitatively? Which of the theoretically postulated Opportunity Recognition competence facets are shown by the apprentices at the end of their VET program?

RQ2: How do the apprentices perform on these OR-facets (apprentices' ability) and how difficult are these competence facets for the apprentices to apply (task/(sub-)item difficulty)?

RQ3: Concerning the Opportunity Recognition competence facets, does the theoretically developed model measure the postulated behavior in an objective, reliable and valid manner?

Table 1: Extract of the Opportunity Recognition competence model of German industrial clerks at the end of their VET program

Level 1: Competence facet	Level 2: Claim	Level 3: Behavior pattern seen as evidence
I. Problem perception	I.1 Perception of chances or problems	I.1.1 The trainee perceives (with aim or by chance) a chance or a problem. I.1.2 The trainee analyses the perceived chance or problem (company perspective). …
	I.2 Gathering problem-specific information	I.2.1 The trainee lists problem-specific sources for information. I.2.2 The trainee identifies and evaluates problem-specific information. …
	I.3 Evaluation of the perceived chances or problems	I.3.1 The trainee lists and uses problem-specific criteria for evaluation. I.3.2 The trainee considers different perspectives during evaluation. …
II. Generation of an intrapreneurial idea	II.1 Generation of an at least incrementally innovative problem solution	II.1.1 The trainee generates at least incrementally innovative problem solutions. II.1.2 The trainee uses creativity techniques (e.g., Mind Mapping, Brainstorming). …
	II.2 Evaluation of the at least incrementally innovative problem solution	II.2.1 The trainee identifies realizable problem solutions. II.2.2 The trainee presents advantages and disadvantages of the at least incrementally innovative problem solution. …
	II.3 Adaptation of the at least incrementally innovative idea through learning effects	II.3.1 The trainee presents shortfalls of the at least incrementally innovative problem solution. II.3.2 The trainee expresses consequences of the shortfalls of the at least incrementally innovative problem solution. …

8.3.2 Sample

The sample consists of industrial clerks at the end of their VET program. As the ASCOT-research team of Weber (Weber et al., 2014) had a collaboration with a large Chamber of Industry and Commerce in Southern Germany the team got access to the exam essays of the full cohort of winter 2011/12. The sample is described in more detail in the next section containing information on the apprentices' gender, the size of the organization and the department where the apprentices conducted their intrapreneurship project. Gender as a differentiation variable is quite common in psychological research concerning creativity and creative output. But there are no definite results concerning

gender effects. At least there are some studies that can prove some gender differences in certain domains (e.g., Arif et al. 2012; Pilar Matud, Rodríguez & Grande 2007). Others cannot show significant differences but tend to postulate advantages for females (e.g., Baer & Kaufmann 2008). The same picture can be drawn regarding the size of a company. There are manifold studies regarding the influence of organizational size on innovations whereas the meta-analysis by Camisón-Zrnoua, Lapiedra-Alcamí, Segarra-Ciprés & Boronat-Navarro (2004: 350) which was conducted as a replica study of that by Damanpour (1992) confirms a positive effect of organizational size on innovation. Caution has to be paid because these analyses are looking at an organizational level of innovation. The categories for the size of a firm were established according to the guidelines of the European Commission (small: 1-49 employees, medium: 50-499 employees, large: at least 500 employees; 2003: 39). The transferability of the results is assumed. The department as a variable can be explained by two facts: on one hand there are many departments within a company where VET takes place but looking at the reports it gets obvious that there is a concentration on several departments. On the other hand as different fields of action have different levels of standardization per se it can be assumed that some domains – especially, Human Resources and Sales – might have more possibilities for innovation than others (Weber, Trost, Wiethe-Körprich, Weiß & Achtenhagen 2014: 291).

8.3.3 Design

To answer the research questions different methods were used. RQ 1 looks at qualitative information. That is why a systematic document analysis according to Mayring (2010) was conducted. RQ 2 addresses the apprentices' abilities concerning Opportunity Recognition behavior patterns as well as difficulties of the situational affordances in mastering the Opportunity Recognition tasks ((sub-)items) corresponding to the postulated claims. Here we used Item Response Theory (IRT) in accordance to the recommendations of the ECD (Geiser & Eid 2010: 19). To assess the competence model's quality (RQ 3) the criteria of objectivity, reliability as well as validity are addressed (Bühner 2011: 58).

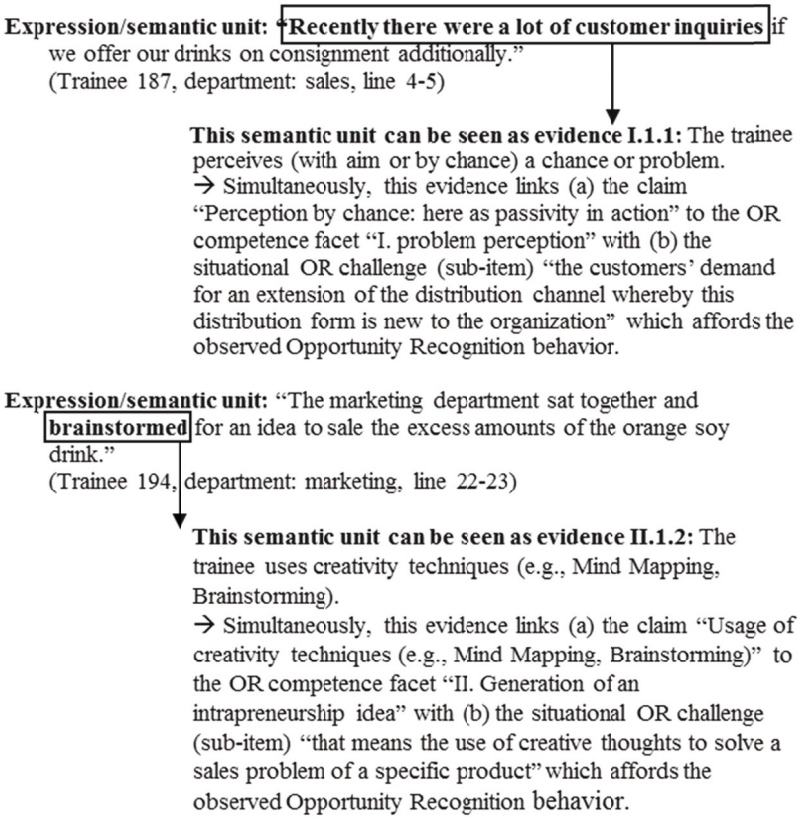
8.3.4 Instrument and analyses

The intrapreneurial behavior patterns are developed within the Dual System of German apprenticeship at two sides: at the firms IP is mainly trained as part of a project which the trainees have to run autonomously at the shop floor according to the Germany wide official training framework for industrial clerks (Verordnung über die Berufsausbildung zum Industriekauf-

mann/zur Industriekauffrau 2002). At the vocational schools the curricular domain "12.2 Implementation of Organizational Projects and Strategies" involves the postulated behavior. This IP-project work is scheduled for the third year of apprenticeship training. In vocational schools it is implemented into the subject 'Occupation-Oriented Project Work' and includes 80 hours of schooling (this corresponds to a share of 40 % of the whole schooling time in the last year of that apprenticeship; Bayerisches Staatsministerium für Unterricht und Kultus 2002: 11). As intrapreneurship is part of the final examination at the Chamber of Industry and Commerce even more importance of intrapreneurship is given. In the training regulations the following formulation can be found as a task for their oral final exams: "In the examination part 'field of application' the testee presents and reports about a professional task which is carried out independently by him/herself […] whereby he/she has to be able to show that he/she could manage a complex specific task and control a holistic working process as well as to elaborate a problem solution in practice" (Verordnung über die Berufsausbildung zum Industriekaufmann/zur Industriekauffrau 2002). It is obvious that the trainees have to demonstrate a network-like thinking which is related to the tremendous labor market changes. Furthermore, the apprentices have to document their project work within a written exam essay designed as a report containing 5-6 pages which is handed in to the examination jury and builds the basis for a discussion and defense within the 30 minutes lasting oral exam. Within our study we take these written exam essays as basis for our analyses. A decisive advantage of this instrument is the uniform task formulated by the training regulations as an impulse for the trainees' learning process and examination output. Here, this task functions as the overarching, huge item; including several sub-items. Furthermore, it is a passive sampling method.

To address the first research question (RQ 1) these reports are coded deductively by two independent coders after an intense coding training where theoretical backgrounds, coding rules and especially anchor examples are presented and discussed (Mayring 2010: 92). Thereby, typical expressions (in the sense of a semantic unit) for each of the evidences are identified. On the one hand these evidences (respectively semantic units) represent situational affordances of Opportunity Recognition in the shape of a sub-item of the overarching project task and correspond on the other hand to the theoretically formulated claims and related competence facets of Opportunity Recognition. An example is shown in Figure 3.

Figure 3: Anchor examples of the coding scheme (including explanation)



Some additional remarks for the coding are necessary: Because our goal was to zoom into OR behavior as one dimension of intrapreneurship in more detail, only reports that showed the evidences of the "perception of chances and problems" (claim I.1) as well as the "generation of an at least incrementally innovative idea" (claim II.1) were taken into account for this analysis. As the IP-project task respectively the reports had an open format, some of the apprentices link their IP-project to the department's innovative idea, whereas others created a new innovative idea completely on their own. Additionally, it was necessary that the idea was new for the organization to be rated as at least incrementally innovative. Looking at the evaluation of the idea (claim II.2), descriptions are allowed to be retrospective because of the fact that the presented projects are already carried out. Last, the adaptations

of the idea through learning effects (claim II.3) do not have to be just theoretically formulated but can be already implemented also due to the character of the instruction for the verbal exams.

Within our next step we address RQ 2 and the trainees' capability values as well as the difficulties of the Opportunity Recognition tasks/sub-items (Geiser & Eid 2010). As basis for this analysis the reports are coded dichotomously: value 0 was coded when there was no evidence for the postulated behavior, value 1 was coded when the postulated behavior could be observed in accordance with our OR-model (Table 1). To reach the objective of enabling an evaluation on the base of reasoning from evidence – which the ECD recommends – a Rasch scaling as form of Item Response Theory was implied (Pellegrino et al. 2014: 580). We used probabilistic test theory as such an approach allows us to model and measure the apprentices' achievements on a theory- and evidence-based level. Additionally, we are able to develop further the latent construct of "Opportunity Recognition" by such a theory- and evidence-driven approach. This chance would not be given by using classical test theory alone – as classical test theory considers just sum-scores independently of the underlying latent psychological construct – here e.g., Opportunity Recognition (Embretson 2010: 1-7). Furthermore, we can use real interval scales (logit scale values) for further analyses – e.g., context factors influencing OR such as gender, firm size, motivation etc.

The third research question (RQ 3) looks at the quality of the theoretically postulated Opportunity Recognition competence model. Therefore, the criteria of objectivity, reliability and validity are addressed. To assess the objectivity intercoder reliability Cohen's Kappa is calculated (Fleiss & Cohen 1973). To assess the quality concerning reliability values won by the Rasch model are used (Koller, Alexandrowicz & Hatzinger 2012: 6). Validity issues are addressed looking at aspects of content validity (Bühner 2011: 61–63).

8.4 Results and Interpretation

The sample consists of N=216 industrial clerks at the end of their VET program. The reports were submitted for the winter exam 2011/12 at a Chamber of Industry and Commerce in Southern Germany. The sample covers the whole population for this Chamber at this time. More apprentices are female (n = 121; 56.0%) than male. More of them (n = 179; 82.9%) are trained in large companies (with at least 500 employees) than in medium sized companies (n = 26; 12.0% with 50–499 employees) or small companies (n = 9; 4.2% with 1–49 employees) (Kommission der Europäischen Union 2003: 39). In total, there are 17 departments registered (Janzik et al. 2010). However, in the departments of Human Resources (n = 59; 27.3%) and Sales (n = 51; 23.6%) most apprentices conducted their intrapreneurship project.

Table 2: Descriptive data of the sample

Variable	Absolute (relative) frequency
Full Sample	216 (100%)
Gender (missing=21)	
• Male	74 (34.3%)
• Female	121 (56.0%)
Size of organization (missing=2)	
• Small	9 (4.2%)
• Medium	26 (12.0%)
• Large	179 (82.9%)
Department (missing=15)	
• Human Resources	59 (27.3%)
• Sales	51 (23.6%)
• Purchasing	30 (13.9%)
• Accounting	10 (4.6%)
• Marketing	9 (4.2%)
• Other	42 (19.4%)

The description shows that the sample is dominated by females. This is conform with the statistical data of the annual VET-report (BMBF: Berufsbildungsbericht 2012: 19): The apprenticeship program of industrial clerk ranks on position 5 for females and position 11 for male (BMBF: Berufsbildungsbericht 2012: 25). The main IP-projects incl. OR are conducted in large enterprises. This is also concordant with the statistical data in VET: large companies have the highest apprenticeship involvement over years (~90%). Small companies are involved in apprenticeship with about 37% on average, medium sized companies with about 75% (Stegmaier, 2009: 20 based on the IAB-Betriebspanel 2000–2008). Furthermore, the main projects are run in the Human Resource and Sales departments. This is also in line with our intensive domain analysis. Maybe the work in these departments has the closest link to the apprentices and is most obviously: they have experiences as employees (internal perspective) as well as experiences as customers (external perspective). Such an extended knowledge basis might function as a helpful pool for OR and the creation of innovative ideas to enhance work processes and products of the firm. Thus, we can confess that we have a very common and plausible sample.

With regard to RQ 1 the percentage of observed evidences of apprentices' Opportunity Recognition behavior across the full sample is listed in Table 3.

Table 3: Descriptive data on Opportunity Recognition behavior across the full sample (aggregated on level 2: Claims)

Variable	Absolute (relative) frequency
Full Sample	216 (100%)
Shown Opportunity Recognition claims	
• I.1 Perception	43 (19.9%)
• I.2 Information gathering	14 (6.5%)
• I.3 Evaluation of perception	36 (16.7%)
• II.1 Idea development	44 (20.4%)
• II.2 Evaluation of idea	43 (19.9%)
• II.3 Adaption of idea	7 (3.2%)

Although we have a very strict understanding, the results show that 20.4% ($n = 44$) of the apprentices developed a new and innovative idea within their intrapreneurship project explicitly by themselves and do not link their IP-idea to a broader innovative idea of the department. The descriptive data also highlight that these apprentices run little information gathering for evaluating their perception and do not express possible shortfalls of their innovative ideas and potential consequences of these shortfalls. The lack of information might be the reason for not thinking in main- and side-effects.

Digging more deeply into the patterns of Opportunity Recognition behavior of the sub-sample ($n = 44$; 100%) we sorted out the semantic units in the following matrix across claims (level 2) and contexts factors like gender, firm size and departments (Table 4).

The results show that *each theoretically postulated claim could be observed* within the apprentices' IP-projects. As the reports' format is open it is very remarkable that all those patterns are shown. With regard to the columns the same pattern as mentioned above is observable: the claims "I.1 Perception of chances or problems", "II.1 Generation of an at least incrementally innovative problem solution" and "II.2 Evaluation of the at least incrementally innovative problem solution" are the claims most often shown. On the other side "II.3 Adaptation of the at least incrementally innovative idea through learning effects" which is related to shortfalls of incremental problem solutions shows the lowest frequency.

Table 4: Descriptive results concerning the Opportunity Recognition behavior patterns (referring to the sub-sample)

Variable	I.1 Perception n=43	I.2 Information gathering n=14	I.3 Evaluation of perception n=36	II.1 Idea development n=44	II.2 Evaluation of idea n=43	II.3 Adaptation of idea n=7
Gender:						
male	39.5%	42.9%	36.1%	38.6%	37.2%	28.6%
female	41.9%	35.7%	47.2%	43.2%	44.1%	57.1%
Firm size:						
small	2.3%	7.1%	2.8%	2.3%	-	-
medium	11.6%	7.1%	8.3%	11.4%	11.6%	-
large	86.0%	85.7%	88.9%	86.4%	88.4%	100%
Department:						
Human Resources	30.2%	28.6%	25%	29.5%	30.2%	14.3%
Sales	23.3%	14.3%	25%	22.7%	23.3%	14.3%
Purchase	13.9%	-	13.9%	13.6%	16.3%	14.3%
Accounting	-	-	-	-	-	-
Marketing	14.0%	28.6%	16.7%	13.6%	11.6%	14.3%
Others	4.7%	-	5.6%	6.8%	7%	-

100% higher than in the trainees' reports of small and medium sized organizations (at mean: +78.5%). Trainees of small enterprises do not show any behavior patterns regarding claim "II.2 Evaluation of the at least incremental innovative problem solution" or "II.3 Adaptation of the at least incremental innovative idea through learning effects". Trainees of large organizations are the only ones who address content that can be classified as claim "II.3 Adaptation of the at least incremental innovative problem solution through learning effects". Last, the sample contains reports of 17 departments in total but apprentices conduct primarily their IP-project in Human Resources and Sales at the end of apprenticeship. In those departments apprentices show the postulated behavior patterns at a mean of 26.3% respectively 20.5% – which can be seen as a hint that these departments with their learning possibilities offer more chances for OR or – as mentioned above – the apprentices have the most experience with regard to these aspects. Remarkable are also the results of trainees in Accounting and Marketing. In Accounting it was not possible to identify neither any intrapreneurial reports nor any Opportunity Recognition. These observations might be interpreted with regard to a more aversive stance on innovation and change in such departments and corresponding less learning opportunities, law and taxation prescriptions, less obvious work

structures or less knowledge of the trainees. Trainees in marketing show Opportunity Recognition claims at a mean of 16.5%. As marketing is per se a very innovative and changing area this small percentage is not quite understandable. But it might be possible that the marketing strategies are more longitudinal and the ideas in OR are often related to short term measures.

Another important fact is that the trainees do present the claims in an integrated manner. An *integrated case example* is given in Table 5 where a trainee reports on an optimization of shelf placing by segment optimization for a soft drink producer. This process was incrementally innovative for the company. The highlighted semantic units were used as evidences (Level 3) for coding and assigning to the claims. The example demonstrates that within one part of the report several evidences of one claim can be found at the same time. It also gives an impression of the complexity of the different IP-projects as they are operationalized and presented by the apprentices.
This overview underlines the high professionalism, coherence and innovativeness by which the apprentices run their IP-projects. It gives an insight into the quantitative values listed above.

Looking at Table 4 there is already a hint to differences in the trainees' abilities as well as to variety of situational affordances of intrapreneurship in general and Opportunity Recognition in particular: whereas 216 apprentices run an intrapreneurship project, only 20.4% of the apprentices show explicitly Opportunity Recognition behavior patterns. Furthermore, the claim "II.3 Adaptation of the at least incremental innovative idea through learning effect" is shown rarely. Exactly for these differences research question two (RQ 2) is raised. Therefore, we run a dichotomously coded Rasch Scaling using the software ACER ConQuest (Wu 2007). The base for the calculation of Item Response Theory was a unidimensional Rasch Model using twenty-six items which represent the evidences (Geiser & Eid 2010: 313). We included into this IRT-analysis the n = 44 trainees' reports which expressed explicitly Opportunity Recognition behavior patterns by themselves. Results for the difficulty of the situational affordances/(sub-items) corresponding to the evidences, claims and OR-competence facets are displayed in Table 6.

Table 5: Integrated case example of an incrementally innovative IP-report: "Optimization of shelf placing through segment optimization" (Trainee 184; female, large company, Sales department)

Level 1: Competence facet	Level 2: Claim	Level 3: Behavior pattern seen as evidence
I. Problem perception	I.1 Perception of chances or problems	*The Trade is challenged in new ways through the demographical change of society.* There are more often small households and a society that gets increasingly older. That means for the soft-drink branch that packaging got too big.
	I.2 Gathering problem-specific information	After drawing the current state of the market ground plan I optimized the general placing *considering market data, customer flow, purchase characteristics and customer demand.*
	I.3 Evaluation of the perceived chances or problems	This is why a fair distribution of ground according to sales and units is *not only useful but necessary.*
II. Generation of an intrapreneurial idea	II.1 Generation of an at least incrementally innovative problem solution	Using the *segment optimization* my company tries to react to the challenge of demographical change.
	II.2 Evaluation of the at least incrementally innovative problem solution	*After six months* of reconstruction there was an *analysis of profitability* using scanner data.
	II.3 Adaptation of the at least incrementally innovative idea through learning effects	*Useful* would have been a *release of some sales consultants.* They then could have been fully concentrating on the project work and therefore finish it more rapidly.

Table 6 shows in line the evidences analyzed displaying the estimates which express the difficulty (low values indicate simple items, high values indicate difficult items), the weighted MNSQ (measure of item fit, should be near 1) including confidence intervals, the t-value (sign. in between -1.96 and 1.96) and the categorization of difficulty (low level = 33%-percentile (<-1.92); high level = 66%-percentile (>.39)). It can be read as follows: Item I.1.1 has an estimate value of -2.37 which can be categorized as low level of difficulty. It has a weighted MNSQ value of .97 and, therefore, fits very well as an item. The t-value of -.2 indicates that the expected values do not significantly deviate from the true values.

Table 6: Difficulty of situational affordances corresponding to the evidences

Level 2: Claim	Level 3: Evidence / Situational affordances / sub-items	Estimate	wMNSQ (CI)	T-value	Interpretation
I.1 Perception	I.1.1	-2.37	.97 (.70, 1.30)	-.2	Low level of difficulty
	I.1.2	-.93	1.14 (.79, 1.21)	1.3	Middle level of difficulty
	I.1.3	1.47	.94 (.00, 2.00)	.0	High level of difficulty
	I.1.4	-2.89	1.06 (.57, 1.43)	.3	Low level of difficulty
	I.1.5	1.15	1.00 (.18, 1.82)	.1	High level of difficulty
I.2 Information gathering	I.2.1	-.26	.90 (.67, 1.33)	-.6	Middle level of difficulty
	I.2.2	.00	.97 (.61, 1.39)	-.1	Middle level of difficulty
	I.2.3	2.66	1.01 (.00, 2.92)	.3	High level of difficulty
	I.2.4	.48	.96 (.46, 1.54)	-.1	High level of difficulty
I.3 Evaluation perception	I.3.1	-1.13	.98 (.81, 1.19)	-.1	Middle level of difficulty
	I.3.2	.67	1.01 (.00, 2.91)	.3	High level of difficulty
	I.3.3	2.65	1.01 (.00, 2.91)	.3	High level of difficulty
	I.3.4	-1.42	.96 (.82, 1.18)	-.4	Middle level of difficulty
II.1 Idea generation	II.1.1	1.91	.99 (.00, 2.82)	.2	High level of difficulty
	II.1.2	1.47	1.06 (.00, 2.00)	.3	High level of difficulty
	II.1.3	-4.21	1.04 (.03, 1.97)	.2	Low level of difficulty
	II.1.4	1.41	.94 (.18, 1.82)	-.0	High level of difficulty
II.2 Evaluation idea	II.2.1	1.14	.96 (.18, 1.82)	.0	High level of difficulty
	II.2.2	-2.37	1.3 (.70, 1.30)	1.8	Low level of difficulty
	II.2.3	.14	.99 (.57, 1.43)	.0	Middle level of difficulty
	II.2.4	.14	1.01 (.57, 1.43)	.1	Middle level of difficulty
	II.2.5	-.50	1.02 (.73, 1.27)	.2	Middle level of difficulty
	II.2.6	-1.43	1.10 (.82, 1.18)	1.1	Middle level of difficulty
II.3 Adaptation idea	II.3.1	.88	1.02 (.30, 1.70)	.2	High level of difficulty

Level 2: Claim	Level 3: Evidence / Situational affordances / sub-items	Estimate	wMNSQ (CI)	T-value	Interpretation
	II.3.2	1.41	1.02 (.18, 1.82)	.2	High level of difficulty
	II.3.3	.48	.94 (.46, 1.54)	-.1	High level of difficulty

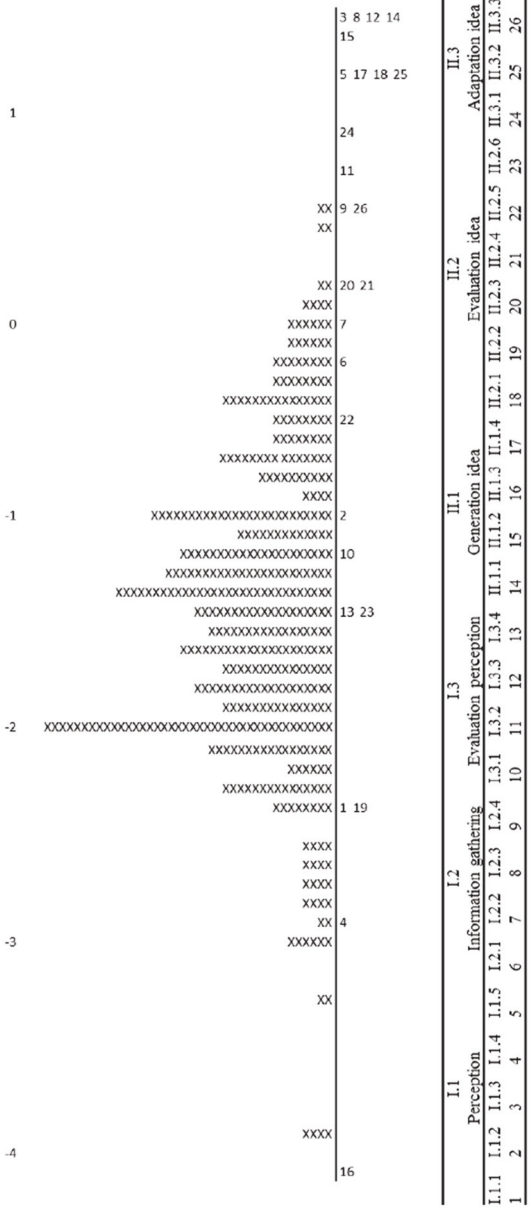
Summing up, there are twenty-six items from which thirteen can be classified as high level of difficulty, nine as middle level of difficulty and only four items as easy for the apprentices. The mean of difficulty is .10. Looking further at the results the weighted MNSQ values are near to 1 so that all items do fit very well. The t-values are in a range of [-1.96; 1.96] (Wu 2007) that means that the items fit to the statistical model. Looking at the values of items' difficulty their estimates range is [-4.21; 2.66] with a mean of .02 (Figure 4).

Only four items can be classified as simple which are concerning the situational affordances/items corresponding to the claims "I.1 Perception of chances or problems", "II.1 Idea generation" and "II.2 Evaluation idea". The shown items all concern a description of something concrete (e.g., perceived opportunity or general advantages and disadvantages of an at least incremental innovative idea). Furthermore, the items related to situational affordances concerning claim "II.3 Adaptation idea" are all classified as high level of difficulty. "I.2 Information gathering" as well as "I.3 Evaluation perception" both show middle and high levels of difficulty.

The trainees' *ability* range is [-3.45; .57] with a mean of -1.37 whereas the Wright Map (Figure 4) is almost evenly distributed, but across the lower level of item difficulty. Especially, the situational OR affordances corresponding to claim "II.3 Adaptation idea" are not sufficiently achieved. Concerning the third research question (RQ 3) different scientific quality criteria are looked at. First, *objectivity* is addressed. Execution objectivity is guaranteed because the ex post analysis of the reports for the verbal exam is a passive instrument. Looking at the evaluation objectivity, Cohen's Kappa inter-rater reliability is calculated (Fleiss & Cohen 1973). The value of $\kappa = 0.84$ reveals a very reliable coding. Interpretation objectivity is being achieved by the coding scheme as well as the theoretical fundament of modeling the Opportunity Recognition competence model (Bortz & Döring, 2006, pp. 195–196).

In a next step *reliability* of the competence model is addressed. Therefore, the EAP/PV value – calculated using the software ACER ConQuest – is .62. It can be interpreted as a reliability measurement like Cronbach's Alpha and is classified, therefore, as acceptable (Jähnig 2013: 53). By further increasing the number of reports this value might be improved.

Figure 4: Wright Map of the reports (n = 44; 'X' represents 0.1 cases)



Last, *validity* aspects are addressed. Content validity is achieved by the extensive analysis of prior research literature in the fields of Opportunity Recognition as well as creativity in general and specifically in an occupational context. Furthermore, the aspect of content validity is shown by the fact that all modeled claims respectively competence facets of OR are represented within the empirical data. That means the full domain of content – modelled by our extensive domain analysis – is covered (Bühner 2011: 61-64).

8.5 Summary, Limitations and Prospect

The aim of this paper is to model an inventory regarding Opportunity Recognition behavior patterns as part of intrapreneurship of German industrial clerk apprentices at the end of their VET program. Additionally, the theoretically postulated competence model should be introduced and empirically validated. Therefore, three research questions have been formulated. Looking at the first one it follows that German industrial clerks show Opportunity Recognition behavior patterns in the exam reports for the Chamber of Industry and Commerce. More than one fifth of the reports show these abilities. Looking at the relevance of those behavior patterns for the continuing success of enterprises as well as the trainees' ability to autonomously shape their occupational career this behavior has to be promoted. Examples underline that the innovation level can be pushed further if the apprentices run intrapreneurial projects on their own. The second research question opens up another perspective: Analyzing the level of difficulty of the situational affordances in Opportunity Recognition reveals that especially the strategic thinking components of item/claim "II.3 Adaptation of the at least incremental innovative idea through learning effects" are rarely shown. It is of special importance to further promote this behavior pattern because it opens up the possibility to continuously innovate already existing products or processes. On the other hand the concrete description of perceived chances respectively opportunities (concerning item/claim I.1) as well as generated ideas and their evaluation (concerning item/claims II.1 and II.2) seem to be comparatively easy – at least in those reports that are classified as self-realized Opportunity Recognition. The third research question addresses the empirical validation of the theoretically postulated model. Consolidating the results of the analysis, the developed Opportunity Recognition model passes the standards of an objective, reliable and valid instrument and, therefore, can be used for future research. Thereby, the reliability aspect has to be checked again with a larger sample.

Our analysis provides a first systematic approach towards modeling and measuring Opportunity Recognition behavior patterns of German industrial clerk apprentices at the end of their VET program. With regard to the small sample size of n = 44 the sample should be increased as well as extended by inclusion of other Chambers of Industry and Commerce – also of regions with different economic data. Referring to the importance of intrapreneurship in general and Opportunity Recognition in particular it is also worthwhile to systematically analyze other commercial apprenticeships as e.g., bank clerks or insurance clerks. Additionally, future research should address predictors for the differences in the apprentices' ability concerning the postulated OR-behavior patterns. For VET practice it is recommended to further promote Opportunity Recognition behavior patterns as the base of future innovations.

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9 Increasing Heterogeneity in Students' Prior Economic Content Knowledge – Impact on and Implications for Teaching in Higher Education

Roland Happ, Olga Zlatkin-Troitschanskaia, Klaus Beck, and Manuel Förster

9.1 Heterogeneous Cognitive Preconditions – a Challenge for Teaching in Higher Education

Studies have revealed increasing heterogeneity among students entering higher education (see Morgan 2012; Zwick 2012; for business and economics studies in Germany see Happ & Zlatkin-Troitschanskaia 2014). In the European Higher Education Area, this phenomenon is attributed, in part, to the structural changes following the Bologna reform (see Bologna Declaration 1999). In general, these changes are attracting a higher age group to tertiary education and are resulting in more heterogeneous student bodies (see Adelman 2009; Association of American Colleges and Universities 2007; Leicht-Scholten, Breuer, Tulodetzki & Wolffram 2011). In the United States, similar trends can be seen in degree courses in economics (for prior knowledge of economics of first-year students in the U.S., see CEE 2014).[1]

Research on secondary (see e.g., Peske & Haycock 2006) and tertiary education has shown that heterogeneous classes are challenging for the teaching (e.g., for differences in prior knowledge of economics at the beginning of higher education, see Brückner, Förster, Zlatkin-Troitschanskaia & Walstad 2015; Zlatkin-Troitschanskaia, Förster, Schmidt, Brückner & Beck 2015). Heterogeneity is found not only in the social and cultural backgrounds of first-year students in economic studies (for approaches considering the personal background in teaching see, e.g., Bartlett 2012), but also in cognitive preconditions, such as prior knowledge of economics (see CEE 2014), and in general intellectual ability (see Prins, Veenman & Elshout 2006). In fact, such differences in personal dispositions often manifest during secondary school (e.g., for PISA, see Fertig 2003; for TIMMS, see Mullis et al. 2000). These differences are perpetuated in the achievements of the students as recorded over the course of their secondary school education and consequently during their

1 For a theory-based discussion on reasons for and implications of the increasing heterogeneity of student bodies in business and economic studies in higher education institutions, see Happ & Zlatkin-Troitschanskaia (2015).

transition to higher education (e.g., Becker & Hecken 2009). In light of this, in some studies the influence of personality characteristics on study outcomes has been reviewed (see Parker 2006). However, to date, no longitudinal analysis has been conducted of how post-secondary students' attributes influence their acquisition of ECK. In this study, we report results from an assessment of ECK over the course of studies in higher education. The evidence can be used to guide the development of suitable didactic and curricular approaches for teaching heterogeneous groups in higher education. Understanding how personality characteristics influence knowledge acquisition is necessary to ensure that increasingly heterogeneous groups of students have an equal chance to succeed in business and economic studies.

To develop adequate measures for teaching in higher education institutions (see section 5), it is essential to know in what ways and to what extent students in the same degree course differ in cognitive preconditions. These preconditions include prior knowledge, which is an indicator for students' acquisition of content knowledge. In the very popular field of business and economics, teachers are confronted with the challenging task of assessing students' prior knowledge in order to tailor teaching methods to meet their students' needs (see Exeter, Ameratunga, Ratima, Morton, Dickson, Hsu & Jackson 2010). Therefore, these teachers need objective data allowing them to decide rationally on teaching-learning arrangements.

To study the influence of personal characteristics on the acquisition of ECK over time, we conducted a longitudinal study measuring knowledge gains while controlling for heterogeneity criteria within the student population.[2] To determine the most important factors of heterogeneity, we followed suggestions from teaching and learning theory and focused on the prior knowledge of learners (see e.g., Brückner, Förster, Zlatkin-Troitschanskaia & Walstad 2015) and on their general intellectual ability (Prins, Veenman & Elshout 2006).[3] We investigated the extent to which these two characteristics affect knowledge acquisition in economics. In addition, we explored whether heterogeneous groups of students with diverse personal characteristics acquire the same level of ECK over the course of their studies in economics.

In section 2, we describe the assessment design and test instrument employed to measure individual states of economic knowledge. In section 3.1, we discuss the analyzed cognitive indicators of heterogeneity. In section 3.2, we present our results based on longitudinal multilevel modeling. We conclude with a critical discussion of our findings and propose some ideas on methods for teaching economics to heterogeneous groups of students.

2 For further information on the theoretical basis of the research project, see Zlatkin-Troitschanskaia et al. (2013) and Happ (in prep.).

3 The reasons for focusing on these two personal characteristics are also discussed in Happ (in prep.), Happ & Zlatkin-Troitschanskaia (2014), and Zlatkin-Troitschanskaia et al. (2013).

9.2 Assessment Design and Test Instrument

Over four dates between 2008 and 2011 we assessed 3,625[4] students from business and economics degree courses. We gathered information on their prior knowledge and intelligence, as well as their performance on an ECK test as indicators of heterogeneity. At the beginning of the winter terms of 2008/09, 2009/10, 2010/11, and 2011/12, students taking basic courses in economics were given a paper–pencil test which took approximately 45 minutes to complete. As part of the survey, students generated a personal code to remain anonymous but, nonetheless, clearly identifiable across several measuring dates (see section 4, also Happ in prep.).

We administered the German adaptation (WBT)[5] (Beck, Krumm & Dubs 2001) of the American Test of Economic Literacy (TEL) developed by Soper and Walstad (1987) to obtain an objective, reliable, and valid measurement of the participants' ECK (see Zlatkin-Troitschanskaia, Förster & Kuhn 2013). In business and economic studies in Germany, economic content (along with parts of statistics and mathematics) comprises a large part of the curriculum (for a curricular analysis of degree courses in Germany (N = 98) and for an online survey of lecturers (N = 78), see Zlatkin-Troitschanskaia, Förster, Brückner & Happ 2014). Thus, the assessment design follows the curriculum–instruction–assessment triangle (see Pellegrino 2010)[6]. The test had been validated comprehensively for higher education in Germany. Validation analyses included content and construct validation (see Förster, Happ & Zlatkin-Troitschanskaia 2012), as well as analyses of prognostic validity (see Beck & Wuttke 2004; Brückner, Happ & Schmidt 2013).

4 This is the total number of observations from 2,615 students. There were 104 observations of students who participated four times, 561 observations of students who participated three times, 1,116 observations of students who participated twice, and 1,844 observations of students who participated once. This unbalanced longitudinal sample required the use of an appropriate method for the statistical analyses, such as longitudinal multilevel modeling (see section 3.2; see Hox 2010; 2011). For a distribution of personal variables, such as gender and age, see Happ (in prep.).

5 The adaptation of this test enables not only national analysis, but also systematic international comparisons (Walstad & Watts 2010; Walstad 1994). The TEL and its adaptations already have been used in many countries, including the U.S., Canada and Australia (MacDonald & Rebeck 2007), Austria, Germany, Great Britain, Korea, Switzerland (Lüdecke & Sczesny 1999), and Japan (Yamaoka, Asano & Abe 2007). The literature includes numerous international comparisons (for comparative studies see, e.g., Yamaoka, Walstad, Watts, Asano & Abe 2010).

6 For use of the triangle model in an intervention study in which economic content knowledge of students in Rhineland-Palatinate was assessed (see Kuhn et al. 2014: 151).

The TEL comprises two versions: A and B. Each version consists of 46 test items including 15 joint anchor items.[7] The items are in multiple-choice format, start with a short description of a situational context, and are followed by four response options, one of which is correct (Asarta & Rebeck 2012). For the English and German tests, measurement properties and quality criteria based on classical test theory have been well researched and validated (Beck, Krumm & Dubs 2001; Soper & Walstad 1987). A varying difficulty of items on the TEL and on the WBT enables differentiation within an adequate range of ability levels from low to high.

The data for this study were gathered using an abridged version of the WBT. The same items were administered at all four assessment dates. From test versions A and B, the 19 items that showed the highest curricular validity were selected. We considered the item selection adequate for assessing student knowledge of economic fundamentals over the course of their studies (see Happ in prep.).

In addition to investigating performance, we gathered socio-demographic data including person-related control variables, such as gender and age. We expected students' prior ECK to vary considerably depending on their previous learning experiences during secondary education. In most federal states in Germany, general education schools do not offer economics as a separate subject. Rather, economic contents and concepts are taught only occasionally and unsystematically in other subjects, such as social studies and geography.

In Germany, 86 percent of higher education students come from general education schools (Federal Statistical Office 2014). Alternatively, students can gain entrance qualifications to higher education from vocational schools or from specialized upper secondary schools, focusing, for example, on business and economics. Only in these types of school business and economic content is taught as an individual subject, allowing programmatic and systematic acquisition of ECK. Thus, students who have completed commercial vocational training (i.e., an apprenticeship) can be expected to have at least rudimentary knowledge of business and economics at their disposal (Kuhn 2014: 233–234). Equally, students having attended a commercial upper secondary school where business and economics are major subjects also should have acquired knowledge of economics. Having this in mind (see Erdel 2010), we operationalized prior ECK by two indicators: either participants had completed a commercial vocational training program or they had attended a course specifically in business and economics at school.

7 The selection of TEL items used in the assessment was verified against the curricula of the participating institutions of higher education. The analysis showed that the selected items were valid with regard to the curriculum of business and economic studies in higher education in Germany.

General student intellectual ability was assessed using two indicators: final school grade[8] and verbal intelligence. Though there is some criticism on the use of the final school grade as an indicator (see Brückner, Happ & Schmidt 2013; Uthmann 2009), in the international studies conducted by Bridgeman, McCamley-Jenkins and Ervin (2000) and in those by Kobrin, Patterson, Shaw, Mattern and Barbuti (2008) students' final school grade correlated with their intellectual ability. This also is true in respect to verbal intelligence as measured by the 20-item scale Verbal Analogies from the German Intelligence Structure Test (IST, "Intellingenz-Struktur-Test 2000R", Liepmann, Beauducel, Brocke & Amthauer 2007), which allows a sum score that is highly correlated with general intelligence to be computed.[9]

9.3 Prior Domain-Specific Knowledge and Acquisition of ECK

9.3.1 Distribution of cognitive indicators among students

In this section, we provide a descriptive analysis of the distribution of the two indicators of heterogeneity in the sample. The following measurement results indicate central tendencies of the respective measurement distributions and illustrate the degree of heterogeneity among the students surveyed. We measured students' prior ECK in terms of the economics-related learning opportunities they had before starting their post-secondary studies, and we gathered data on students' general intellectual ability as indicated by their final school grades and their performance on a verbal intelligence scale.

Our findings reflected the typical diversity of pre-university education in Germany. Of our students, 20.5% had completed a commercial apprenticeship before entering university and 27.7% had taken business and economics as a major subject at school. This result indicates that more than half of the first-year students entered tertiary education without any systematic knowledge of business and economics.

Grade values ranging from 1.0 (best grade) to 4.0 (lowest passing grade) showed a standard deviation of 0.5 in final school grades, with the median being 2.3. Half of the students surveyed achieved a final grade ranging from

8 In Germany, the final school grade upon graduation from upper secondary school serves as an entrance qualification for studies in higher education institutions.

9 In this study, we also used the Number Series scale to assess numerical intelligence. However, we soon observed ceiling effects and excluded the items on number series from further assessment. This is why data on numerical intelligence is not available for all measuring dates, and why we did not include it in the longitudinal analysis.

2.0 to 2.7; 25% of the students achieved a grade better (i.e. lower) than 2.0, while another 25% achieved a grade worse (i.e. higher) than 2.7. These results signify a substantial variance in final school grades and, thus, a heterogeneous distribution among the students.

A similar picture emerged regarding the distribution of verbal intelligence based on the IST verbal analogy sub-scores. The median was 11 of the 20 points. Scores showed a standard deviation of 3.2 points. Half of the students scored between 9 and 13 points; one-quarter scored fewer than 9 points; and one-quarter scored more than 13 points. Again, these results indicated a heterogeneous distribution of general intelligence among the students. Overall, we found a heterogeneous distribution of prior ECK and general intellectual ability among the students of our sample.

9.3.2 Effects of Prior ECK and General Intellectual Ability on the Acquisition of ECK over the Course of Studies

To analyze the effects of prior ECK and general intellectual ability on the acquisition of ECK, we used multilevel models of change measurement (see Hox 2011; Raudenbush & Bryk 2002).[10] We used confirmatory factor analysis (Kline 2005; Byrne 2012) in Mplus (Muthén & Muthén 1998–2014) to analyze the dimensionality of the 19 items from the WBT based on the assessment data gathered at each of the four assessment dates. The analyses of the 19 items showed a one-dimensional structure:

Table 1: Confirmatory factor analyses for the four assessment dates

	t_1	t_2	t_3	t_4
Estimator	WLSMV	WLSMV	WLSMV	WLSMV
N	789	699	1,097	1,040
χ2/df	1.42	1.52	1.55	1.77
χ2	215,591	231,723	235,854	269,645
Df	152	152	152	152
RMSEA	0.023	0.027	0.022	0.027
TLI	0.937	0.816	0.947	0.900

Surprisingly, we did not find two separate dimensions, one for microeconomics and one for macroeconomics (Hansen 2001; OECD 2011; Zlatkin-Troitschanskaia et. al 2014). All items showed a significant positive loading on the latent factor. This can be explained, in part, by the use of an abridged

10 For a discussion on methodology regarding the advantages of multilevel modeling over, for example structural equation modeling based on latent growth curves (see Chou, Bentler & Pentz 1998).

version of WBT/TEL. Furthermore, some general principles of economics, such as the scarcity principle, apply to a broad range of economic issues, including fundamentals of economics as well as microeconomics and macroeconomics. Therefore, we calculated the following multilevel models based on only one total score of ECK.

Regarding the multilevel analyses, we had various options to measure time. In our study, we could have made use of the age of the students, the four assessment dates t_1–t_4, or the number of the students' completed semesters of study. Singer and Willett (2003) suggest using a data exploration procedure with several measures of time in order to determine the best one. In the end, we based modeling on the number of completed semesters of study as a measure of time because the exploratory data analysis clearly indicated that this measure would provide the best results (see Happ in prep.). This made sense because a higher number of completed semesters of study also would indicate a higher number of completed courses in economics.

We analyzed the data using longitudinal multilevel modeling. The serial observations over the four assessment dates (level 1) were nested in the students (level 2). It was reasonable to assume that the level of ECK would vary less over time for the same participant than it would among participants. Such dependence can be represented through multilevel modeling. But to justify the use of the multilevel approach, we first needed to confirm that we could predict enough of the variance on all levels through meaningful predictors (see e.g., Singer & Willett 2003).

In the beginning of our analyses, we calculated a random intercept only (RIO) model (Snijders & Bosker 1999) by running the command "xtmixed" on STATA (Rabe-Hesketh & Skrondal 2012: 249). In this RIO model, the intra-class correlation coefficient (ICC) amounted to 0.32, which means that 32% of the whole variance was caused by the students being in different semesters. Taking into account that the number of economic courses attended had not yet been controlled, this was a substantial part of the variance (on the calculation method, see Luke 2004). To represent the non-linear development of ECK over the course of studies in the multilevel models, we progressively included a linear, quadratic, and cubic term for time (see Goldstein 2011). In addition, we evaluated whether or not each term significantly improved the model. In doing so, we considered Hox' recommendation (2010: 33) telling us that, if in doubt, a preference should be given to simpler, lower-order models rather than higher-order models. In all models, the linear term for time was positive and affected especially the initial semesters. We found a larger increase in ECK at the beginning of a student's studies and stagnation

from the sixth semester onwards.[11] The decrease we identified was due to the significant negative quadratic term for time. From the perspective of teaching and learning, the shape of this declining part of the development curve (see Figure 1) can be interpreted as an indication of the effects of forgetting (e.g., Baddeley, Eysenck & Anderson 2010). In later semesters, the decrease in the level of ECK resulting from the negative quadratic term for time was compensated for by the positive and also significant cubic term.

Next, we analyzed the extent to which personal cognitive attributes affected the acquisition of ECK over the course of studies. The two factors of prior ECK and general intellectual ability proved to have a substantial influence on the level of ECK. In the cubic model, all four indicators had a significant influence on acquisition of ECK. The results of the calculations are shown in Table 2.

Gill and Gratton-Lavoie (2011) reported similar results for the United States, where completing a course in economics at high school also had a positive effect on the level of ECK.

It is worth noting that all these calculations refer to the intercept term, that is, the differences apply only to the initial levels of ECK (Hox 2010). This also implies that the differences in initial knowledge levels are not compensated (substantially) for over the course of studies. The multilevel analysis showed variance only in the intercepts, not in the slope factors. This means students varied only in their initial level of knowledge, not in their knowledge acquisition rate (see Happ in prep.). Figure 1 shows a plot of the acquisition of ECK among the students surveyed along the course of their studies.[12] Depending on prior ECK and general intellectual ability, the curve of ECK may start from a higher or lower level. The final knowledge level is determined exclusively by the intercept term and not by the slope factors, which did not contribute to the explained variance.

11 It might be possible that we assessed a selection of low-performing higher-semester students because we did not expect those students to attend the courses. The sample included students with up to 18 semesters of study. We also calculated these models for a sample excluding students who had completed more than 12 semesters, but this did not lead to any substantial changes in the results. This means that considerably fewer students in higher semesters did not introduce any element of bias to the parameter estimations.

12 Regarding the development curve, we used the test instrument to assess fundamental knowledge in economics (see section 3) in higher education only. This test instrument does not assess specialized economic content from advanced levels of study. Nevertheless, the fundamentals assessed are also relevant for higher semesters of study since they form the basis for more specialized content (see Happ in prep.).

Table 2: Acquisition of ECK based on a cubic multilevel model

Fixed Effect	
Intercept	9.461521***
Slope number of semesters (linear)	1.035718***
Slope number of semesters (quadratic)	- 0.1238821***
Slope number of semesters (cubic)	0.0044762***
t_2	0.7248816**
t_3	0.1639293
t_4[13]	- 0.300272**
Commercial vocational training (completed)	0.5566519***
Course in business and economics as major school subject (taken)	0.5611557***
Final school grade (centered)	0.5279176***
Analogy score (centered)[14]	0.322575***
Random Effect	
Residual variance level 2	2.822618
Residual variance level 1	4.613816
Model Quality	
Deviance	17,943.54
AIC	17,969.54
BIC	18,050.50

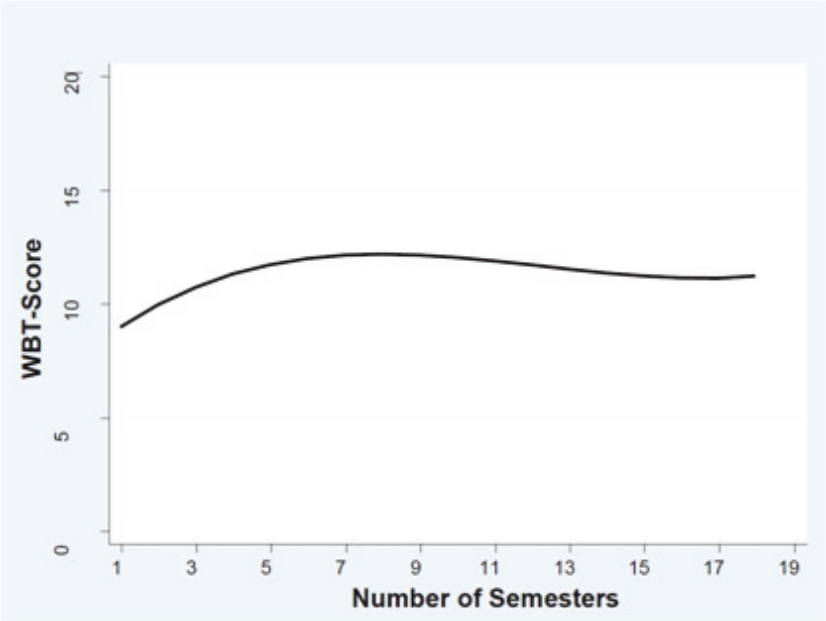
*** significance level p < 0.001 (two-sided);** significance level p < 0.05 (two-sided);* significance level p < 0.1 (two-sided)

The results clearly show that the differences in the acquisition of ECK, which result from heterogeneous personal cognitive attributes of students, were not compensated for through learning opportunities in higher education over the course of their studies (using the number of economic courses completed as an indicator for learning opportunity).

13 This study was conducted over four assessment dates. At each, there might have been different experimental conditions of test taking. To control for effects of different assessment conditions in the longitudinal analysis, we included the dates as dichotomous variables in the models.

14 Final school grade and analogy score were centered on the median for easier interpretation. This means the coefficients in the multilevel model are indicated in relation to a final school grade of 2.3 and an analogy score of 11.

Figure 1: Development of ECK



9.4 Implications for Teaching Economics in Higher Education

Our analyses clearly confirmed the supposition that students of business and economics differ significantly in their prior ECK and their general intellectual ability.[15] The initial data of our study revealed substantial heterogeneity among the first-year students. As long as it is a generally accepted expectation of higher education instructors to compensate for these differences by interventions via tuition in the sense of mastery learning (for the origins of mastery learning, see Carroll 1963; Motamedi & Sumrall 2000; Jensen 2006), teaching economics in higher education will remain an enormous challenge. The situation is very similar in the United States, where colleges have to cope

15 In this paper, we do not discuss international comparisons of differences in prior economic content knowledge among students, but rather refer to other studies such as the international comparison between Germany and the United States based on the Test of Understanding in College Economics (TUCE; Walstad, Watts & Rebeck 2007) reported by Brückner, Förster, Zlatkin-Troitschanskaia & Walstad (2015).

with rapidly increasing numbers of students enrolling in economics courses (see Siegfried 2012: 724). With regard to the sample of students in Germany, our analyses showed that acquisition of ECK over the course of their studies was strongly influenced by their personal cognitive preconditions.

The findings from longitudinal modeling highlight the crucial importance of formative performance assessments (see Dolan & Burling 2012) at least in business and economics in higher education. In other words, process diagnostics at a degree course level and at an individual level are urgently needed. For teachers in higher education, it would be a major advantage to have access to information on students' preconditions, made available through systematic assessment and analysis at the beginning and over the course of their studies. This information could enable teachers in higher education to address the needs of their students in an informed and adequate way when designing curricula, preparing learning opportunities, selecting content and methods, and delivering courses. Moreover, having accurate information on their students' preconditions, teachers could be encouraged to develop new, innovative forms of teaching, learning, and assessing, which in turn would help them manage in a competent and fair way their heterogeneous classes. Today, numerous methodological approaches and didactic suggestions are geared to the needs of small groups of learners (e.g., on using cooperative learning exercises in economics, see Hoyt & McGoldrick 2012). It is not our aim to criticize these approaches; rather we strongly propose that – in times of Massive Open Online Courses (MOOCs; see Perna, Ruby, Boruch, Wang, Scull, Ahmad & Evans 2014) – learner-centered approaches should also be developed for large-scale courses.

In the case of economics[16], a teaching method that deserves mentioning is Simkins's (2012) "Just-in-Time Teaching" (JiTT). In JiTT, learners are given a few short exercises and are asked to submit their responses prior to class. The teacher evaluates the responses and, by doing so, he or she can better prepare the next class by adapting it to the needs of the given learners. A key advantage of this method is that the teacher can prepare the class to address major misconceptions the students may have (see Bransford, Brown & Cocking 2000). As a result, teachers are able to tailor their teaching approach to the current state of knowledge of their students. In addition, this might encourage students to reflect metacognitively on their personal learning processes (see Simkins 2012: 111). For larger courses, it is possible to use JiTT with online exercises in a multiple-choice format combined with an online tool that provides the teacher with information on the students' current state of knowledge, a strategy which functions as a kind of formative assessment. This also could encourage students to engage with the subject matter outside of class (see Simkins 2012: 110). At the same time it could help

16 For a more detailed review of learning methods in economics, see Hoyt & McGoldrick (2012).

teachers estimating the extent to which students understand the subject matter.

McDermott (1991: 303) points out that there is a considerable difference between a teacher's expectations of what students should know and what students actually know at the beginning of course. To help teachers understand their students better, JiTT might offer a measure to detect knowledge gaps among students before course begins. Of course, JiTT is only one of many methods to improve academic teaching in large-scale courses. However, common to all of them is that teachers are in need of valid information not only on the prior knowledge and learning skills of their students but also on the progress of knowledge and skills acquisition they stimulate through their teaching.

Another possibility would be to offer preparation courses for students before they begin to study at university. This might ensure that the prior ECK of a group of students is more homogenous at the beginning of degree courses. Preparation courses, such as those in mathematics, often are offered in higher education. In economics, no core curriculum or standards for general secondary education exists. ECK is taught unsystematically, making it a challenge for universities to define economic principles and determine prerequisite knowledge for university students. As long as this situation continues, preparation courses could serve to eliminate some of the heterogeneity in prior ECK among students at the beginning of higher education.

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10 The Necessity for Well-Founded Teacher Education in Economics – Findings from Curriculum Analyses

Christin Siegfried

10.1 Introduction

Everybody has to make daily decisions requiring a good understanding of political and economic systems to manage and design our life but also to react on changes in these systems. Already in the early stages of adulthood, individuals need to decide on which job to choose, which party to vote for or on what money to spend on. For all these activities economical knowledge is necessary, which usually derives from economic education taught in schools in several subjects.

Against this background, there is a growing consensus in literature and policy that the support of economic competence should become a core component of general education systems (Dubs 2011; Retzmann et al. 2012; Kaminski 2001; Beinke 2004). In accordance with that, most German states' school curricula take the development of economic competence into account nowadays. Despite, survey studies found that young adults show a severe lack of economic competence (e.g., Beck 1993; Walstad & Rebeck 2001; Hoidn & Kaminski 2006; Müller, Fürstenau & Witt 2007; Retzmann et al. 2012). Since school education is crucial for adolescents' knowledge, these results suggest that schools fail to impart sufficient knowledge on economics although it is prescribed officially. As several surveys indicate a direct connection between the competences of students and their teachers (e.g., Allgood & Walstad 1999; Rivkin, Hanushek & Kain 2005; Goldhaber & Anthony 2007), the question is raised whether teachers themselves have sufficient economic competence to adequately support their students' learning processes in this topic. Indeed, studies (e.g., Retzmann & Bank, 2012) showed that teachers teaching economics do not have sufficient economical competence. Since especially university provides future teachers with essential content knowledge (CK) and pedagogical content knowledge (PCK) (e.g., Kunina-Habenicht et al., 2013), it is crucial to analyse teachers' learning opportunities for acquiring economic competence within their academic education. Therefore the core question of this article is: "To what extend do prospective teachers of Politics and Economics have opportunities to learn economics within their university education?" Depending on the results, it is

aimed to develop and evaluate a training programme in economics for prospective teachers.
The remainder of this article is organized as follows. First, economic competence will be defined. Then, the development of teachers' economic competence, mainly their domain-specific professional knowledge in economics, will be discussed and brought together with the implementation of economics within general education[1]. Next, the model of economic competence will be described and used as the basis for a curricula analysis in general education as well as in university programs for prospective teachers using a documentation analysis approach. The results will be compared to investigate to what extend prospective teachers should be enabled to adequately teach the prescribed economic contents. Finally, the findings will be discussed and further research steps will be presented.

10.2 Theoretical Background

10.2.1 Economic competence

Although the debate about the conceptualization of economic competence has a long history (e.g., von der Aa 1924; Beck 1989; Salemi 2005; Tenfelde & Schlömer 2012; Schumann & Eberle 2014), there is no clear consensus on how economic competence can be specified and what dimensions and contents should be included. The conceptualization of "ökonomische Bildung"[2] by Beck (1989) is a common construct in German-speaking countries. Beck criticizes the blurredness of the concepts of "ökonomische Bildung" which are sometimes used interchangeably and sometimes refer to nuanced differences in meaning (Salemi, 2005). Beck (1989) analytically separates the construct of "ökonomische Bildung" into single and therefore measurable individual characteristics. In doing so, he defines "ökonomische Bildung" along three dimensions: 1) economic knowledge and thinking, 2) economic attitudes, and 3) economic-related moral judgment (Beck 1989). Hence, these components describe the coordinates of a 3-dimensional space, which can be used to describe positions or economic stances in "ökonomische Bildung". For example, a tax evader has an excellent economic knowledge and a high level of economic interest. Nevertheless, he cannot be described as being an

1 General education in Germany is organized by each federal state individually. Therefore differences in subjects and contents might occur between the states. Exemplarily the actual study focuses on general education in the federal state Hesse.

2 "Ökononomische Bildung" or – more precisely – the term "Bildung" is a specific German construct and therefore difficult to translate. Bildung is a concept of education that is a lifelong process of human development, rather than mere training of knowledge and skills.

economically educated citizen, since he violates the norms of our society (low level of moral judgement). A comprehensive economically educated citizen must therefore score high values along all three subscales.

Considering the definition of competence by Weinert (2001) in which skills, knowledge and motivational as well as volitional aspects are included, the described concept of "ökonomische Bildung" can be related to economic competence. This is due to the fact that its dimensions of knowledge, attitudes and moral judgment are comparable to the defined aspects of competence. Since the term "ökonomische Bildung" is unique in German-speaking countries and since a holistic definition of competence can include moral judgement as well, the term economic competence will be used within this study. More recent studies (e.g., Schumann & Eberle, 2014) refer to the definition by Beck and confirm this "anatomy" of the term "ökonomische Bildung". Economic competence is therefore defined as the knowledge and ability to decide responsibly within different restrictions such as competition or scarcity and personal constraints (Beck & Wuttke 2005). Thereby basic economic competence comprises the following basic concepts (see Table 1).

Past studies measuring economic competence have predominantly focused on children and adolescents (e.g., Beck, 1993; Retzmann et al., 2012; Schumann et al., 2010; Atkinson & Messy, 2012; Mandell, 2009). Within the debate over competence and its measurement, research interest has recently shifted from students to teachers, as teachers' competence and their teaching ability have a substantial impact on students' learning (Allgood & Walstad, 1999). Recent studies focus on domains such as mathematics, physics or languages (Krauss et al., 2008; Blömeke et al., 2008; Riese & Reinhold, 2012; Blömeke et al., 2011). There are only a few surveys focusing on the measurement of economic competence (McKenzie, 1971; Walstad, 1980; Kuhn et al., 2014, Bouley et al., 2015).

10.2.2 Teachers' domain-specific professional knowledge

Student performance is influenced by different factors such as student characteristics, class characteristics or teachers' domain-specific professional knowledge (e.g., Marzano, 2000; Campbell et al. 2004). Teachers' domain-specific professional knowledge is seen as the most powerful factor (Ball, Thames & Phelps 2008; Hill, Ball & Schilling 2008) and it influences student performance positively (Hattie 2009; Hill, Rowan & Ball 2005; Kunter et al. 2013; Lipowsky et al. 2009).

The model of Shulman (1986) is an often considered model when conceptualizing teachers' professional knowledge. It differentiates professional knowledge into three components, namely CK, PCK, and pedagogical knowledge (PK). Especially CK and PCK play a core role in developing

teachers' professional knowledge (Ball, Thames & Phelps 2008; Bromme 2001; Hill, Ball & Schilling 2008; Krauss et al. 2008).

Table 1: Basic concepts of economic competence (Soper & Walstad 1987)

I	Fundamentals	II	Microeconomics
1.	Scarcity	7.	Market & Price
2.	Productivity	8.	Supply & Demand
3.	Opportunity Costs / Trade-off	9.	Competition & Structure
4.	Economic Systems	10.	Income Distribution
5.	Economic Institutions and incentives	11.	Market Failures
6.	Money and Exchange	12.	Role of government
III	Macro Economics	IV	International
13.	Gross National Product	20.	Competitive Advantage & Trade Barriers
14.	Aggregate Supply	21.	Balance of Payment and Exchange Rates
15.	Aggregate Demand	22.	Economic Growth
16.	Unemployment		
17.	Inflation / Deflation		
18.	Monetary Policy		
19.	Fiscal Policy		

Despite the fact that both components together are essential to provide sufficient teaching quality (Krauss et al. 2008; Riese & Reinhold 2012, Kuhn et al. 2014), first and foremost PCK has a high impact on students' learning success (Baumert et al. 2010). Moreover, PCK is dependent on CK, as knowledge of the content is a necessary requirement for structuring classroom instructions by focusing on student understanding (Krauss et al. 2008; Neuweg 2010). Hence, only with established basic CK teachers can react, interact, and (in consequence) build up teaching quality and success (Neuweg 2010). Various studies provide evidence that CK and PCK correlate (r = .81 for mathematics and physics see Krauss et al. 2008; Blömeke et al. 2008; Riese & Reinhold 2012; r = .4 for German and r = .6 for English see Blömeke et al. 2011; r = .4 for Economics see Kuhn et al. 2014; see also Bouley et al. 2015). Further confirming this connection, teachers who have deficits in CK have been found to have difficulties when it comes to identifying students' misconceptions, providing descriptions or explanations, and implementing appropriate assignments (Halim & Meerah 2002; Thanheiser 2009; Sullivan et al. 2010, 2013). The following section focuses on how teachers acquire CK during their university education.

10.2.3 The importance of opportunities to learn within teachers' university education

In Germany, teacher education comprises two consecutive phases with different focuses. Moreover, the responsibility for teacher certification and curricula lies with the federal states, respectively. While the first phase, university education, is more theory-oriented, providing a solid foundation in subject-matter studies, the subsequent second phase, a practical training, provides first teaching opportunities under the supervision of experienced teachers. This separation and decentralization of teacher education is relatively uncommon in other countries. Usually the entire teacher education takes place in universities or specified schools of education providing both subject-matter and pedagogical studies (Carnoy et al. 2009).

Nevertheless, both phases of the German teacher education model include PCK and CK, but with a different accentuation. While actually there is no sufficient empirical proof regarding the impact of the second phase of teacher education (Weyland 2014; Hascher 2011), surveys show that learning opportunities within the university have a positive effect on teachers' professional knowledge (Cochran-Smith 2005; Kunina-Habenicht et al. 2013; for CK: Blömeke et al. 2008; for PCK: Riese & Reinhold 2012, practical content: Hascher, Cocard & Moser 2004). Moreover, Walstad and Rebeck (2001) show that the attendance of economics lectures increases economic competence.

Following from the direct influence of teacher education at university on the teacher's professional knowledge, it is material for universities to provide respective learning opportunities. The need for such courses becomes evident when taking into account that all federal states have implemented subjects, covering economic topics (see Table 2).

Although there are curricula for economic topics across all types of schools in Germany, each federal state realizes the implementation differently regarding the name of subject and type of school (grammar school (GS) and middle school (MS)). Whereas in some states and mainly in GS specific economics-oriented subjects such as "Economics" or "Politics and Economics" exist, there are others that address economical contents as part of courses. Titled "History Social Studies Geography" or "Social Studies", those kind of courses are more focused on the humanities such as sociology and political science. Especially in Hesse economic topics are studied as part of a subject titled "Politics and Economics," and are taught in middle and grammar school (Schmid, Beckmann & Wiesen 2012).

Table 2: Implementation of economic subjects in Germany

Federal State	Type of school	Economic subject	Combination subject
Baden-Württemberg	MS	e.g., economics-labour-health	
	GS	e.g., geography economics social studies	e.g., social studies
Bavaria	MS	e.g., economics and law	e.g., history social studies geography
	GS	e.g., economics and law	e.g., social studies
Berlin	MS	labour studies	social studies
	GS	economics	e.g., social studies
Brandenburg	MS	economics labour technics	
	GS	economics labour technics	
Bremen	MS	economics labour technics	world ecology (history, geography, policy)
	GS	economics labour technics	world ecology (history, geography, policy)
Hamburg	MS	e.g., labour and work	society
	GS	politics society economics	
Hesse	*MS*	*politics and economics*	*labour studies*
	GS	*politics and economics*	*society studies (labour studies)*
Mecklenburg-West Pomerania	MS	labour economics technics	social studies
	GS	labour economics technics	e.g., social studies
Lower Saxony	MS	economics	
	GS	politics and economics	
North Rhine Westphalia	MS	economics and labour studies	history politics and society
	GS	economics and politics	
Rhineland Palatinate	MS	e.g., economics and social studies	
	GS		community studies (geography, history, social studies)
Saarland	MS	labour studies	social studies
	GS	labour studies	e.g., society studies
Saxony	MS	e.g., economics technics household	
	GS	community studies law education economics	
Saxony Anhalt	MS	economics	social studies
	GS		social studies
Schleswig-Holstein	MS	e.g., politics and economics	
	GS	politics and economics	
Thuringia	MS	e.g., economics and law	social studies
	GS	economics and law	social studies

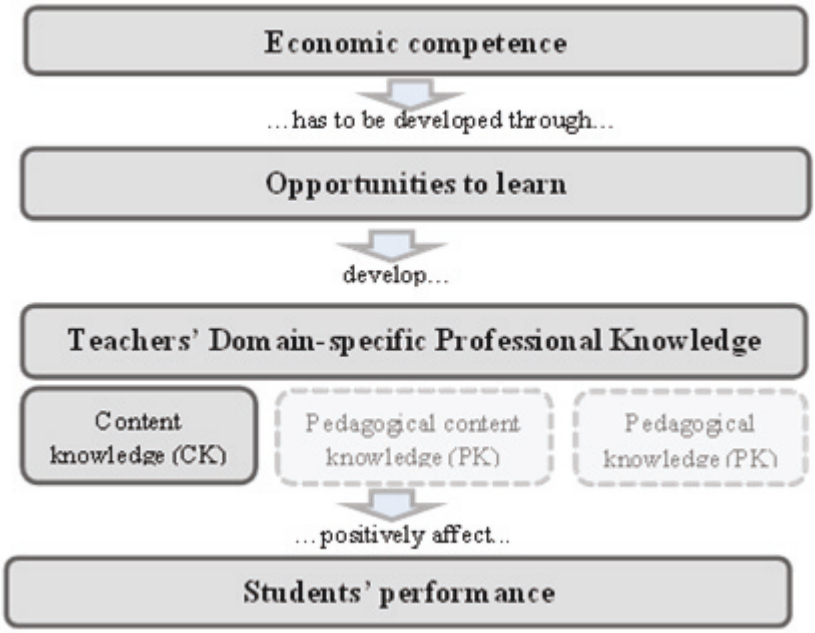


Figure 1: Framework of the causal chain of teacher education in economics

In summary, the theoretical effect chain taken as a basis for this paper focuses on economic competence, its development through economic opportunities to learn within academic teacher education and its implementation and teaching in general education. However, due to the aim of this study, I will rather focus on economic CK as part of teachers' professional knowledge than on PCK and PK (see Figure 1).

Building on this theoretical framework, the following chapter will analyse school curricula and curricula of academic teacher education at different universities, to provide a comparison of the contents covered in teachers' education and the content requirements of the courses they will later teach.

10.3 Curricula Analysis

10.3.1 Methodology

Procedure

For an overview of teachers' requirements in economics within general education, middle and grammar school curricula were analysed. In a second step, learning opportunities for teacher students in the German state of Hesse were analysed to examine to what extent teacher education in Politics and Economics matches the requirements stated in the school curricula.

For the analysis (school and university curricula) the above mentioned categories of basic economic competence (see table 1) were used as a categorical framework. To do so, two raters classified the economic contents within the curricula frameworks published by the state government of Hesse and the module frameworks published by the universities of Hesse based on the categories of basic economic competence. There was a high inter-rater reliability with a kappa coefficient at 0.87.

Materials

The curricula documents consist of a general part "foundation", and a "practical teaching" part, both of which are content-specific. Whereas "foundation" includes tasks, learning objectives and didactic and methodological foundations, the "practical teaching" part covers subject-specific content that is specific for every school form (grammar school and middle school) (e.g., Hessisches Kultusministerium, 2006, 2010). Moreover, the "practical teaching" part also includes cross-references to other subjects, such as economic topics in mathematics. These references are especially interesting for interdisciplinary teaching (e.g., Hessisches Kultusministerium 2010). In general, the requirements within the curriculum are obligatory with optional contents also being offered. The implementation of some contents in teaching is therefore often linked to individual preferences and beliefs of the teachers. On the one hand, this voluntary character offers the opportunity for individual teaching, while unfortunately failing to provide sufficient advice as to whether and to what extend specific content should be covered in the classroom.

The second step is focused on the curricula of teacher education (module handbooks) in Hessian universities (for middle school: Frankfurt am Main, Gießen and Kassel; for grammar school: Frankfurt am Main, Darmstadt, Gießen, Marburg, and Kassel). For both curricula and module analyses, the same rationale will be applied.

10.3.2 Results of the curricula analyses and interpretations

Economic topics in middle school

Generally, in the curriculum for the subject Politics and Economics, microeconomic topics as well as fundamentals largely outweigh macroeconomic and international topics. Especially international contents are hardly considered (see Table 4).

For example, the topic "economic system, social market economy and collective bargaining", that is embedded in the curriculum of form ten (Hessisches Kultusministerium, 2010), refers to the categories of basic economic competence such as "Market and Price" or "Aggregate Supply". Nevertheless, beside the fact that the subject Politics and Economics in middle school includes different economic contents these are considered mainly from a political perspective.

Table 3: Economic contents within middle school curricula in the subject Politics and Economics

Form	General Topic	Related Categories of Basic Economic Competence
7	coexistence in family	*Fundamental*: Scarcity
		Microeconomics: Income Distribution
		Macroeconomics: Unemployment
	environment protection	*Fundamental*: Productivity
		Microeconomics: Market Failures
9	working within the information society	*Fundamental*: Economic Systems
		Microeconomics: Competition & Structure
		Macroeconomics: Unemployment
		International: Competitive Advantage & Trade Barriers; Economic Growth
	social issues in the Federal Republic of Germany	*Microeconomics*: Role of Government
		Macroeconomics: Unemployment
10	economic system, social market economy, collective bargaining	*Fundamental* in total
		Microeconomics in total
		Macroeconomics: Gross National Product; Aggregate Supply; Aggregate Demand
	equality	*Macroeconomics*: Unemployment
	traffic and environment	*Fundamental*: Productivity; Opportunity Costs/ Trade-offs
	one world	*International*: Competitive Advantage & Trade Barriers; Economic Growth

Table 4: Economic contents within grammar school curricula in the subject Politics and Economics

Form	General Topic	Related categories of basic economic competence
7	economic literacy: economic management in households	*Fundamental* in total
	economic literacy: market	*Microeconomics*: Marge & Price; Supply & Demand; Competition & Structure
	social state	*Microeconomics*: Income Distribution; Market Failures
9	economic literacy: economics and labour market	*Fundamental*: Productivity; Opportunity Costs/Trade-offs; Economic Systems; Economic Institutions & Incentives *Microeconomics*: Market & Prices; Competition & Structure *Macroeconomics*: Unemployment
	social state and economics	*Microeconomics*: Income Distribution; Market Failures
	economic literacy: international economic relations	Fundamental: Productivity *Microeconomics*: Competition & Structure *International*: Competitive Advantage & Trade Barriers; Balance of Payment & Exchange Rates; Economic Growth
10	social structure, socio-economic change	*Microeconomics*: Role of Government *Macroeconomics*: Aggregate Supply; Aggregate Demand; Unemployment
	ecology and economic growth	*Fundamental*: Scarcity *Macroeconomics*: Gross National Product
11	economics and economic policy	*Fundamental*: Economic Systems *Microeconomics*: Competition & Structure; Income Distribution; Role of Government *Macroeconomics*: Gross National Product *International*: Competitive Advantage & Trade Barriers; Balance of Payments & Exchange Rates
	international relations and globalization	*International*: Competitive Advantage & Trade Barriers; Balance of Payment & Exchange Rates; Economic Growth
12	aspects of globalization – opportunity – problems- perspectives	*International*: Economic Growth

Economic topics in grammar school

At Hessian grammar schools, economic contents are primarily covered in the subject Politics and Economics, which is described in the curriculum as basic subject for economic education (Hessisches Kultusministerium, 2010). In contrast to the previously analysed subject Politics and Economics in middle school, in grammar school, foundations of economics, microeconomics and

macroeconomics have a high priority. Hence, general macroeconomic contents such as "labour market", "economic growth", "economic cycle", and "market" are covered several times, but also the perspective of employees (income, qualifications, and work situation) is addressed in grammar school curricula. Moreover, these topics are broadened to economic, business ethics and general policy such as "consumer behaviour" or "social welfare state" (see Table 5). Hence, a connection between pupils' everyday life and the school lessons is being created.

Comparing the number and the different economic contents related to the categories of basic economic competence within grammar school and middle school shows that macroeconomic contents as well as international economic contents are mainly addressed in grammar school. Nevertheless, most of the categories of basic economic competence are addressed in both types of school.

Economic topics within the university education of prospective middle school teachers

Next, economic modules in university education of prospective middle school teachers provided by different Hessian universities were analysed (i.e. Frankfurt, Kassel, Gießen). Table 6 clearly shows the differences in the implementation of economic modules and its associated seminars at the different universities.

While, for example, at least one obligatory economic module covering economic topics is implemented at the University of Gießen ("economic principles and economic policy") and at the University of Kassel ("technical principles in economics"), at the Goethe-University Frankfurt this module is only obligatory to choose ("economic principles and labour market"). However, at Frankfurt, most of the economic contents are taught from a political perspective. These findings are similar at the University of Gießen as well as at the University of Kassel, where economic modules are also offered, but similarly to Frankfurt focus primarily on political or social issues instead of economic concepts.

Overall, the analysis shows that teacher education is structured in a way that allows students to graduate and go on to teach "Politics and Economics" at middle schools with very little formal education on economic topics and without a comprehensive understanding of economic concepts or principles.

Table 5: Economic content in university curricula for middle school teacher education for the subject Politics and Economics

University	Modules with economic content	Economic seminars	Related categories of basic economic competence
Justus-Liebig-Universität Gießen	economic principles and economic policy (obligatory)	1) economy mainstreaming 2) governance and institutional cooperation within labour market 3) problems of politics and economics	1.) Microeconomics (7, 9, 10, 12); Macroeconomics (16); International (20) 2.) Microeconomics (12); Macroeconomics (16) 3.) Microeconomics (11, 12)
Universität Kassel	technical principles in economics (obligatory)	1) microeconomics 2) macroeconomics	1.) Fundamental (4); Microeconomics (7, 8, 9, 10) 2.) Macroeconomics (13, 14, 15, 16, 17, 18, 19)
Goethe-Universität Frankfurt	economic principles and labour market (obligatory)	1) labour and employment in transition 2) introduction to political economy 3) money and values	1) Microeconomics (7, 9, 10); Macroeconomics (13, 16) 2) Fundamental (4, 5) Microeconomics (7, 10, 12) Macroeconomics (18) 3) Fundamental (6); Microeconomics (12); Macroeconomics (18, 19)

Fundamental:	1. Scarcity; 2. Productivity; 3. Opportunity Costs/ Trade-offs;
	4. Economic Systems; 5. Economic Institutions & incentives; 6. Money Exchange
Microeconomics:	7. Market & Prices; 8.Supply & Demand; 9. Competition & Structure;
	10. Income Distribution; 11. Market Failures; 12. Role of Government
Macroeconomics:	13. Gross National Product; 14. Aggregate Supply; 15. Aggregate Demand;
	16. Unemployment; 17. Inflation / Deflation; 18. Monetary Policy; 19. Fiscal Policy
International:	20. Competitive Advantage & Trade Barriers;
	21. Balance of Payment & Exchange Rates; 22. Economic Growth

Economic topics within the academic education of prospective grammar school teachers

Universities in Hesse offering programs for becoming a grammar school teacher are more common than universities for becoming a middle school teacher. In addition to the previous three, the University of Marburg and the Technical University of Darmstadt were included in the analysis that follows. Similar to the curricula for middle-school teachers analysed above, there is also a large heterogeneity between Hessian universities concerning the implementation of modules with economic contents in the education of prospective grammar school teachers (see Table 7).

Table 6: Economic content in university curricula for grammar school teacher for the subject Politics and Economics

University	Name of the module with economic content	Economic seminars	Related categories of basic economic competence
Technische Universität Darmstadt	economics (obligatory)	1) introduction to economics 2) introduction to business administration	1) Fundamental (2, 3, 4, 5); Microeconomics (7, 8); Macroeconomics (13, 14, 15, 16, 17, 18, 19); International (22) 2) Fundamental (2, 3)
	economic specialization (obligatory elective)	1) microeconomic 2) macroeconomic	1) Fundamental (2); Microeconomics (7, 8, 9, 11, 12) 2) Macroeconomics (13, 14, 15, 16, 17, 18, 19)
	labour market and social security (obligatory elective)	1) specialization on labour law, in particular: collective labour law	1) Microeconomics (12); Macroeconomics (16)
	business administration specialization (obligatory elective)	1) accounting 2) cost accounting	1) Fundamental (2) 2) Fundamental (2)
Justus-Liebig-Universität Gießen	economic principles and economic policy (obligatory)	1) economy mainstreaming 2) governance and institutional cooperation in the labour market 3) problems of politics and economics	1) Microeconomics (7, 9, 10, 12); Macroeconomics (16); International (20) 2) Microeconomics (12); Macroeconomics (16) 3) Microeconomics (11, 12)
Universität Kassel	technical principles in economics (obligatory)	1) microeconomics 2) macroeconomics	1) Fundamental (4); Microeconomics (7, 8, 9, 10) 2) Macroeconomics (13, 14, 15, 16, 17, 18, 19)
Philipps-Universität Marburg	political economics I (obligatory)	1) political economics in Germany 2) introduction to international political economy 3) introduction to political economy	1) Microeconomics (11, 12) 2) International (20, 21) 3) Microeconomics (11, 12)
Goethe-Universität Frankfurt	economic principles and labour market (obligatory)	1) labour and employment in transition 2) introduction to political economy 3) money and values	1) Microeconomics (7, 9, 10); Macroeconomics (13, 16) 2) Fundamental (4, 5,) Microeconomics (7, 10, 12); Macroeconomics (18) 3) Fundamental (6); Microeconomics (12); Macroeconomics (18, 19)
	economic and social policy (obligatory)	1) money and monetary policy	1) Fundamental (6); Microeconomics (7); Macroeconomics (17, 18)

For category coding, see Table 6

The already mentioned module "economic principles and labour market" at the Goethe-University Frankfurt is obligatory for prospective grammar school teachers. Moreover this module is complemented by a second economic module "economic and social policy". However, the discrepancy between the offered economic modules and their limited content of economic concepts and principles within the different seminars of this module is the same as in the module plan for prospective middle school teachers (compare chapter 3.2.3)

A further result is that, in comparison to the previously mentioned universities of Frankfurt, Gießen, Kassel and Marburg, the University of Darmstadt places a stronger focus on the inclusion of economic concepts and principles. Prospective grammar school teachers are required to pass one compulsory economic module ("economics") and additionally they are obligated to choose one of three ("extended economics", "labour market and social security", "extended business administration"). Moreover, these courses are not offered by the departments of social and educational science, as it is the case for example at the Goethe-University Frankfurt, but by the economics department. In addition, the University of Darmstadt offers prospective teachers comprehensive opportunities for specialization in economic topics (e.g. in microeconomics, macroeconomics, and accounting).

To sum it up, the number of economic modules the academic education of teacher students for grammar schools at all Hessian Universities is noticeably higher in comparison with the program for middle school teacher students. Besides, at least one obligatory module with economic content has to be chosen by teaching students of grammar school.

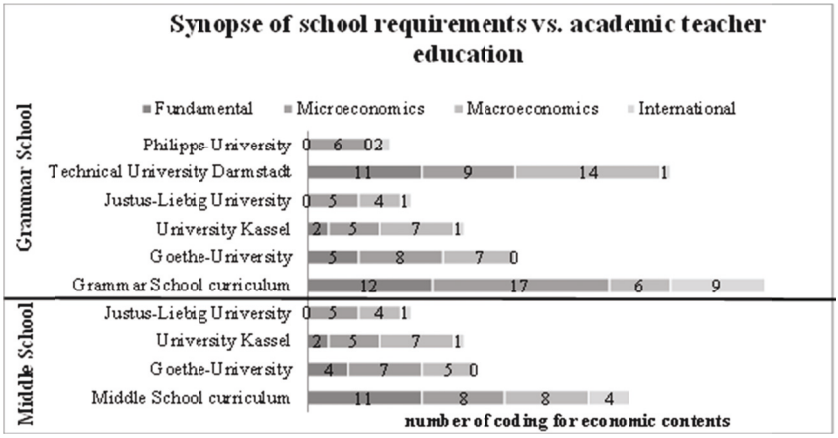
Summary

Results of this study show that the core concepts falling within definition of basic economic competence are almost exclusively implemented as part of the subject Politics and Economics. The analyses of the school curriculum and module plan of the universities show that microeconomic as well as fundamental economic topics receive general attention in these courses, while macroeconomic and international economic themes are hardly addressed in grammar school at all and only addressed by coincidence in middle school. It can be said in conclusion that economic education has become part of the core curriculum today. However, significant parts necessary for a comprehensive understanding are not covered at all. Partly responsible for this shortcoming might be the insufficient academic education teachers receive.

In contrast, the analysis of module handbooks in use at Hessian universities reveals significant discrepancies when compared to the state's school curricula. Economic topics receive a minimum of attention and when they are covered, only isolated economic issues such as "Economic Institution and

Incentives" or "Monetary Policy" are addressed. Thus, a holistic overview is difficult to obtain for teacher students. Figure 2 shows the number of coding capturing all economic contents within academic teacher education for the subject Politics and Economic in middle school and grammar school in comparison to the appropriate school curriculum.

Figure 2: Comparison of the maximum of economic contents within academic education of teachers and school requirements



However this table shows only the maximum of possible economic content provided in university. Apart from that, even if teacher students were to attend all economic seminars offered, going beyond their credit requirements and potentially extending the duration of their studies, they can hardly cover all necessary content required by school curriculum.

Moreover, the analysis showed that students studying at the University of Frankfurt could theoretically graduate without ever having covered these topics in class. This is partly due to the limited requirements for attendance of such courses but also caused by a lack of seminars on offer that would cover the relevant content. Nevertheless, they will later be required to teach classes on exactly these topics. Among the analysed universities, Darmstadt is the only one with a large number of compulsory and voluntary seminars on economic topics.

10.4 Limitation

The curricula analysis is based on the available module handbooks and school curricula. Hence, the results might not reflect the reality of what topics are actually covered in class. Additionally, in school as well as in university curricula economic contents are formulated on a rather general level and do not specify precise learning objectives.

Moreover, the categorical framework of basic economic competence used here only focuses on political economics and does not cover any business administration contents. Although this framework seems adequate for the categorization of economic contents in general education schools, specific economics courses cover a considerable amount of business administration topics (Schumann et al. 2010). However, in spite of the fact that these issues might have been left underappreciated by the framework that was used, one has to keep in mind that business administration is not yet formally part of general education curricula.

Furthermore, due to the combined teaching of both subjects, politics and economics, many lessons on economic contents in school and university curricula contain both political and economic aspects at unknown weighting. Putting the fact aside that that such a combination is highly desirable as it fosters relational understanding aside, it creates difficulties for classifying and quantifying the results accurately. In addition, the extent to which a specific topic is treated in the different lessons is decided solely at the teacher's discretion.

10.5 Discussion and Conclusion

In order to get a holistic overview of what is required in school and to what extend academic teacher education fits these requirements, curricula content in place at Hessian universities and schools was analysed. Next, economic competence of prospective teachers of different universities in Hesse was analysed in order to evaluate to what extend the number of economic courses improves economic competence of prospective teachers. Results of this study show that the number of courses and the level of economic competence correlates. Therefore, by backward induction, the poor performance of German pupils in economics can at least partially be attributed to deficits of economic content in their education, as demonstrated by curricula analyses.

To be a responsible citizen as well as to handle daily situations in life, young adults should be equipped with basic economic competence. To live up to this task, teachers have to receive an education that provides them with

a comprehensive understanding of the relevant topics. This implies the necessity to not only address current requirements in economics but to also address, evaluate and select economic learning situations in class with respect and in consideration of their pupils.

Although flexibility in curricula is desirable, it imposes the risk of topics relevant for the development of economic competence being neglected or omitted due to a lack of professional knowledge on the teachers' part, not as the result of a constructive didactic decision. Hence, subject specific modules or opportunities to learn should be provided at university during the academic education of teachers. However, the results of my analyses of university curricula show that such learning opportunities barely exist.

Prospective teachers can complete their academic education for the subject Politics and Economics without having attended any economic module. Therefore it can be concluded that there is a significant discrepancy between the requirements on the part of schools and the training and knowledge of teachers. Consequently, politicians, regulators and educational institutions must develop curricula that ensure that prospective teachers' economic knowledge meets the demands of a modern society.

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