


Article

Choosing a Business or Economics Study Program at University: The Role of the Economics Teacher

Michael Jüttler *  and Stephan Schumann

Department of Economics, University of Konstanz, 78464 Konstanz, Germany

* Correspondence: michael.juettler@uni-konstanz.de; Tel.: +49-(0)-7531-88-5328

Abstract: The choice of a study program is based on complex individual decision-making processes. Thereby, economics is one of the most popular fields of study worldwide. Considering previous studies, the role of the teacher is often neglected. However, it can be assumed that teachers' professional knowledge plays a significant role in a student's choice of a study program. Thus, the present study investigated the influence of the professional knowledge that students perceive in their economics teacher on their aspirations and choice of an economics study program. The longitudinal data of 1387 Swiss high school students were analyzed. Economic competencies were measured multidimensionally and included knowledge, motivation, interest, value-oriented dispositions, and attitude. There were small to moderate correlations between the professional knowledge that students perceived in their economics teacher and their economic competencies. With regard to the intention and choice of economics, the results show small to moderate effects of the pedagogic content knowledge and the general pedagogic knowledge that students perceive in their teacher. These findings contribute to the discussion on the role of the economics teacher. It is therefore recommended that the teaching professionalism of economics teachers, which has been criticized in different countries, be promoted more strongly and more systematically.

Keywords: economic literacy; economic education; teachers' professional knowledge; study aspirations; subject choices; transition research



Citation: Jüttler, Michael, and Stephan Schumann. 2022. Choosing a Business or Economics Study Program at University: The Role of the Economics Teacher. *Journal of Risk and Financial Management* 15: 522. <https://doi.org/10.3390/jrfm15110522>

Academic Editor: Shigeyuki Hamori

Received: 15 September 2022

Accepted: 4 November 2022

Published: 8 November 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Study choices are key junctures in the educational and professional careers of young people (Asdonk et al. 2013; Stocké 2007; Johnson and Muse 2017; van Herpen et al. 2020; Haas and Hadjar 2020). Such transitions are characterized by complex and momentous decisions (e.g., Rach and Heinze 2017; Geisler and Rolka 2021; de Clercq et al. 2017)—complex in that such decisions are conditioned by a multicausal set of relationships involving social and psychological factors, and momentous in that such decisions can only be reversed or corrected to a limited extent without incurring certain costs (Asdonk et al. 2013; Ecclestone et al. 2009). Against this backdrop, transitions from school to higher education have been a central field of educational policy, as well as pedagogical, psychological, sociological, and educational research, for many decades (ibid.). Especially from a socio-psychological point of view, a primary interest is in making transitions from school to university as fitting as possible. “Fitting” in this context means that young people choose a course of study or a profession whose content and task match their abilities (ability congruence), interests (interest congruence), and needs (needs congruence) as closely as possible (e.g., Etzel and Nagy 2015). For this reason, students' domain-specific competencies (knowledge and skills, interest, motivation, etc.) at the end of upper-secondary education are considered to be of great importance for a successful transition or the appropriate choice of a study program (e.g., Eccles and Wigfield 2002, 2020). Besides these individual factors, contextual factors are also considered significant. In this regard, the role of the teacher is also increasingly considered to be of great importance (ibid.). It is assumed

that teachers can directly or indirectly influence the study and career orientations of young people (e.g., [Faitar and Faitar 2013](#); [Metheny et al. 2008](#); [Wong et al. 2021](#); [Chetty et al. 2013](#)). The main function must be seen regarding the influence of teachers' professional knowledge on students' individual learning process (e.g., [Kunter et al. 2013](#); [Burić and Kim 2020](#); for economics, see, e.g., [Compen et al. 2019](#); [Urban et al. 2020](#); [Siegfried 2016](#)). Nevertheless, to date, there are no empirical findings on the causal relationship between the teachers' professional knowledge and students' study choices. This lack of research must be critically reflected against the discussion regarding the importance of the professional knowledge of economics teachers worldwide (for a recent literature review, see [Compen et al. 2019](#)). There is also strong discussion on a national level, e.g., in Germany (e.g., [Wuttke et al. 2016](#)), Switzerland (e.g., [Eberle 2015](#)), Austria (e.g., [Fritsch et al. 2015](#)), the U.S. (e.g., [Day et al. 2021](#); [Walstad and Watts 2015](#); [Allgood and Walstad 1999](#)), Belgium (e.g., [Beckker et al. 2019](#)), and South Africa (e.g., [Ogbonnaya et al. 2020](#)).

Considering existing literature, it must be emphasized that the majority of studies have focused on STEM (e.g., [Wang and Degol 2013, 2017](#); [Wang 2013a](#); [Lauermann et al. 2017](#); [Geisler and Rolka 2021](#)). Fewer studies are focusing on the field of economics¹. However, looking at overall enrollment rates, economics is among the most chosen fields of study worldwide, accounting for about one-fifth of all students (e.g., [Organisation for Economic Cooperation and Development 2019, 2020](#); [Swiss Coordination Centre for Research in Education 2018b](#)). The popularity of this group of subjects results not only from a great interest in such courses of study but especially from the broad field of work and the associated career opportunities and earning potential (e.g., [Livermore and Major 2020](#)). Considering this, fostering economic competencies at school is important for preparing school students for an economics study program at university.

In this context, numerous studies have already shown the importance of prior economic education and high economic competencies at the end of school for a successful transition to an economics study program ([Happ et al. 2018](#); [Brückner et al. 2015](#); [Jüttler 2020](#); [Jüttler and Schumann 2019](#)). However, a deficit of previous research lies in the lack of consideration of the effects on teachers and their professional knowledge ([Wuttke et al. 2016](#); [Holtsch et al. 2019](#); [Compen et al. 2019](#)). In particular, for transition research and the field of economics, there is a lack of empirical evidence showing how these are related to the transition to an economics study program and the related effects of students' economic competencies. In this regard, it is unclear what role teachers play in ensuring that students choose to study an economics study program in a way that aligns with their economic competencies.

Thus, the present study aims to analyze the interrelations between the professional knowledge that students perceive in their economics teacher, their economic competencies, and their intention and decision to study in an economics study program. The present work thus addresses an important desideratum of previous research in this study area (for an overview of recent studies in this field, see, e.g., [Compen et al. 2019](#); [Wuttke et al. 2016](#); [Schlax et al. 2020](#); [Aprea et al. 2016](#); [Happ and Zlatkin-Troitschanskaia 2021](#); [Kühling-Thees et al. 2020](#)).

In the first step, definitions of central terms are presented (economic competencies and teachers' professional knowledge). To connect these concepts with study choices, the expectancy–value model, according to [Eccles and Wigfield \(2002\)](#), is presented. This theoretical model serves as a basis to empirically investigate the underlying research question. Therefore, the specific methods (including the underlying data) that were used are described. This results in the presentation of a specific path analysis based on the theoretical model. Finally, a concluding discussion, a deduction of possible implications, and an outlook on further research desiderata are presented.

2. Theoretical Background

2.1. Definition of Economic Competencies—A Multidimensional Construct

There is no common definition of economic competencies ([Wuttke et al. 2016](#)). Existing definitions range from an understanding that focuses on (private) financial issues (such as

an understanding of investments, managing one's own assets, etc.—so-called “financial literacy”) to an understanding that places a stronger focus on socially relevant economic knowledge (e.g., a basic understanding of interest rates, public debt, or unemployment rates—so-called “economic literacy”). Within these concepts, there are different gradations. In this regard, most definitions of economic literacy are limited to basic economic knowledge (business knowledge or accounting tends to be excluded). Furthermore, many approaches are limited to a pure knowledge component and exclude facets that lie outside of cognitive performance dispositions, such as interest or motivation (Jüttler 2020; Schumann and Eberle 2014)

Following the general definition of competencies by Weinert (2001), the definition in the present study is broad and includes knowledge and skills but also further motivational and affective facets. Thus, economic competencies are defined as follows:

- Economic knowledge and skills as a basis to be able to solve economic issues and to judge solutions to economic problems;
- A motivation to address and an interest in economic issues as a basis to be willing to solve them;
- An attitude towards economics and value-oriented dispositions whereby one is willing to have an economic perspective and morally reflect on different solutions.

While the motivation to address economic issues is process-oriented and describes why someone is engaged in persistently solving an economic issue (see Ryan and Deci 2000; Deci and Ryan 1985), interest is object-oriented and describes how likely someone is to pay attention to an economic issue at all (see Prenzel et al. 1996). In contrast, the attitude toward economics describes how (socially) relevant a person considers the solution to economic problems and how willing he or she is to adopt an economic perspective. Finally, value-oriented dispositions describe one's ability to include the opinions and interests of other stakeholders in the solution of economic issues and thus represent the basis for a reflected solution.

2.2. Definition of Teachers' Professional Knowledge

To define professional knowledge, we refer to the model of teachers' professional competence by Baumert and Kunter (2006, 2013). The aim of this model is to describe which competencies a teacher needs in order to support the learning processes of students (Baumert and Kunter 2013, p. 26). Thereby, the model focuses on a profession where classroom interaction is its core. In this regard, Baumert and Kunter (2006) combined the considerations of teacher-specific professional knowledge by Shulman (1986, 1987) with models for general professional competence (e.g., Weinert 2001). Based on these considerations, teachers' professional knowledge represents one of four dimensions of professional competence and builds the core of professionalism (Baumert and Kunter 2013). It is subdivided into five knowledge dimensions:

- Content knowledge;
- Pedagogical content knowledge;
- Pedagogical knowledge;
- Counseling knowledge;
- Organizational knowledge.

Content knowledge and pedagogical content knowledge are the two core elements of a teacher's professional knowledge, which must be assigned to their domain-specific knowledge. This includes teachers' knowledge of the content and their knowledge about teaching this content (Baumert and Kunter 2013, p. 31). Content knowledge includes the sovereign mastery of the school knowledge (Baumert and Kunter 2006, 2013). Pedagogical knowledge comprises explanatory knowledge, knowledge of students' perceptions and ideas regarding a certain domain (e.g., misconceptions), and knowledge of tasks. Both of these dimensions must be assigned to domain-specific knowledge and are strongly dependent. In this regard, previous studies found moderate to strong correlations between content knowl-

edge and pedagogical content knowledge (see, e.g., [Krauss et al. 2008](#); [Fritsch et al. 2015](#); [Baumert and Kunter 2006](#)). In addition, pedagogical knowledge describes domain-general knowledge, e.g., conceptual knowledge of the foundations of education (e.g., psychology of human development), general pedagogical knowledge of instructional planning (e.g., domain-general principles of lesson planning), and knowledge of classroom management and the orchestration of learning opportunities (e.g., variation in social forms and methods of learning). Counseling and organizational knowledge are additional types of knowledge that are not directly assigned to instructional practice ([Baumert and Kunter 2013](#)). Considering studies on the explanation of learning outcomes or the academic achievement of school students, these types of knowledge play a subordinate role and have hardly been the subject of empirical studies to date.

The present study focuses on the three core dimensions of professional knowledge: content knowledge, pedagogical content knowledge, and pedagogical knowledge, which are directly associated with practical instruction and formal learning processes within the classroom and which are (with the exception of pedagogical knowledge) domain-specific.

Since content knowledge and pedagogical content knowledge are domain-specific, a large amount of research exists regarding the modeling and measuring of these types of knowledge with regard to the subject of economics (e.g., [Kuhn et al. 2016](#); [Bouley et al. 2015](#); [Köpfer 2022](#); [Day et al. 2021](#)). However, no general definition exists due to the different subject areas that are covered within this domain. In this regard, many models are limited to accounting classes (e.g., [Bouley et al. 2015](#); [Fritsch et al. 2015](#)) because they have special characteristics within the domain of economics, showing great similarities in terms of task structuring to the study of mathematics. In general, content knowledge is often distinguished between business administration (including accounting) and economics (see, e.g., [Zlatkin-Troitschanskaia et al. 2019](#)). While business administration comprises areas of accounting, sales management, and human resources, economics is further distinguished by the fundamentals of economics (e.g., scarcity), microeconomics (e.g., theory of production), and macroeconomics (e.g., monetarism) (*ibid.*). These facets are typically tested by focusing on either business administration (e.g., business administration knowledge test; see [Bothe et al. 2006](#)) or economics (e.g., the Test of Economic Literacy, TEL, see [Walstad et al. 2013](#)) and are therefore not necessarily aligned to a specific curriculum. Considering pedagogical content knowledge, [Kuhn \(2014\)](#) developed a domain-specific model that is based on two fundamental structures (see also [Kuhn et al. 2016](#)): (1) content structure (knowledge of teaching objectives, content, and methods; knowledge of students' learning processes) and (2) cognitive structure (propositional knowledge, case knowledge, and strategic knowledge). This definition strongly refers to the general definition of pedagogical content knowledge by [Shulman \(1986\)](#). Teaching objectives, content, and methods are strongly interdependent: a teaching objective could be the ability to make an appropriate financial decision for a property; the content could then comprise types of financing (e.g., annuity loan), and a method could be a case study. The second component of the content structure refers to the knowledge of students' learning processes and comprises aspects such as knowledge of typical errors (see also [Köpfer 2022](#)) or the adequate manner in which to address heterogeneity within the classroom (e.g., considering students' prior knowledge; see [Kuhn 2014](#); [Kuhn et al. 2016](#)). The three types of knowledge within the cognitive structures are directly associated with the cognitive processes of remembering, understanding, applying, analyzing, evaluating, and creating (*ibid.*). For instance, teachers need to remember and understand subject-related principles (propositional knowledge, e.g., the principles of using case studies in economics) that they must analyze and apply with regard to a certain context in order to find an adequate didactic solution (case knowledge, e.g., to adequately represent different forms of financing) and which they need to evaluate in relation to a concrete teaching situation (strategic knowledge, e.g., the use of this case study in a vocational school class versus in a grammar school class). For a more detailed discussion on the modeling and measuring of content and pedagogical content knowl-

edge in the field of economics, (see, e.g., [Kuhn et al. 2016](#); [Köpfer 2022](#); [Day et al. 2021](#); [Kuhn 2014](#); [Bouley et al. 2015](#)).

2.3. *The Interrelations between Professional Knowledge, Economic Competencies, and Study Choice*

There are different approaches that explain subject choices or, more specifically, the choice of a study program. A prominent psychological model is the expectancy–value theory by [Eccles et al. \(1983\)](#) (see also [Eccles and Wigfield 2002, 2020](#)). In their model, they extend the approaches of sociology in their expectation and value components. In doing so, they consider characteristics of social origin as well as individual perceptions of the value and the expected success of different decision alternatives. This model is enriched by considerations that lie between the effects of social origin and the individual interpretation of decision alternatives and therefore combine elements of both psychological and sociological approaches (*ibid.*). The EVT model by [Eccles and Wigfield \(2002, 2020\)](#) has proven to be an important and useful theoretical foundation for answering numerous research questions in both school and university settings, and its underlying relationships have been empirically proven in numerous studies (e.g., [Eccles and Wigfield 2020](#); [Berweger et al. 2022](#); [Rosenzweig et al. 2022](#); [Wigfield et al. 2021](#)). Figure A1 in Appendix A presents the extended EVT model by [Eccles and Wigfield \(2002\)](#) in a simplified form. Considering this model, it becomes clear that students' values and expectations are directly influenced by their perceptions of their own skills and the evaluation of their personal experiences in their social environment (e.g., school, family, and peers). These perceptions and interpretations, in turn, are influenced by gender and other cultural stereotypes, the socializer's beliefs, and previous achievement-related experiences (e.g., in school). Educational goals and aspirations can be seen as results of this process and directly influence their expectations and values, which in turn explain their educational choices and future performance.

Since the model brings many correlations into a causal relationship and thus achieves a relatively high degree of complexity, it is possible to use the model as a starting point for a specific simplification of partial contexts related to a concrete question. In addition, the model builds a basis for integrating further theoretical considerations that are not directly implemented but related to certain aspects of the model (for a discussion on the usage of the model, see also [Eccles et al. 1983](#)). Thus, three adjustments based on the model are made below:

- (1) A reduction to the variables central to this study;
- (2) An embedding of the professional knowledge that students perceive in their economics teacher;
- (3) A transfer to the context of the choice of an economics study program.

The result of these adjustments is presented in Figure 1. Considering economic competencies, it is assumed that these positively influence students' intention to study economics. In this regard, higher economic competencies lead to an increasing probability of the intention to study economics. The effects of economic competencies are controlled by further competencies, e.g., mathematical and verbal skills; and the social background, e.g., socio-economic status.

Prior achievement-related experiences, e.g., school grades, also influence students' intention to study economics. In this regard, it is important to note that, theoretically, this effect is mediated by students' individual interpretations of these experiences as well as the expectations of their social environment. These causal interrelations can be directly derived from EVT and are represented on the left side of the model (see Figure 1).

Although the teacher represents a significant part of the beliefs and behaviors of students' social environment (see [Eccles et al. 1983](#); [Eccles and Wigfield 2002, 2020](#); [Wong et al. 2021](#); for economics, see also [Compen et al. 2019](#)), EVT does not directly implement teachers' professional knowledge within their model. Therefore, the representation or implementation of teachers' professional knowledge and its influence on students' study aspirations require a more extensive justification. There are numerous studies that point to the significant role of teachers' behavior on students' vocational orientation (which includes their study

aspiration, e.g., [Noack et al. 2010](#); [Metheny et al. 2008](#); [Chetty et al. 2013](#)). Considering teachers’ professional knowledge, there is strong evidence that teachers’ content knowledge, pedagogical content knowledge, and pedagogical knowledge influence students’ (domain-specific) learning outcomes (e.g., [Kunter et al. 2013](#); [Krauss et al. 2008](#); for recent reviews, see, e.g., [Burroughs et al. 2019](#); [Basma and Savage 2018](#); [Didion et al. 2020](#)), whereby a strong focus lies on teachers’ pedagogic content knowledge. Regarding this, there is evidence that teachers strongly influence students’ interest in school subjects (e.g., [Krauss et al. 2008](#); [Upmeier zu Belzen and Christen 2004](#)). Studies in the field of economics provide evidence of positive effects on students’ economic competencies (see, e.g., [Compen et al. 2021](#)), whereby many studies refer to the U.S. educational system (e.g., [Allgood and Walstad 1999](#); [Dills and Placone 2008](#); [Butters et al. 2011](#); [Totenhagen et al. 2015](#); [Maxwell et al. 2005](#)). This provides great evidence in support of the assumption that economics teachers’ professional knowledge positively influences students’ economic competencies at the end of upper secondary education, especially their domain-specific attitudes and interest, as well as their school grades in economics. Individual domain-specific skills (here, economic competencies), in turn, are modeled as predictors (or mediators) for study aspiration. There is strong evidence of the positive influence of domain-specific competencies on study aspirations, especially in the STEM fields ([Wang and Degol 2013](#); [Wang 2013a, 2013b](#); [Wang et al. 2013](#)).

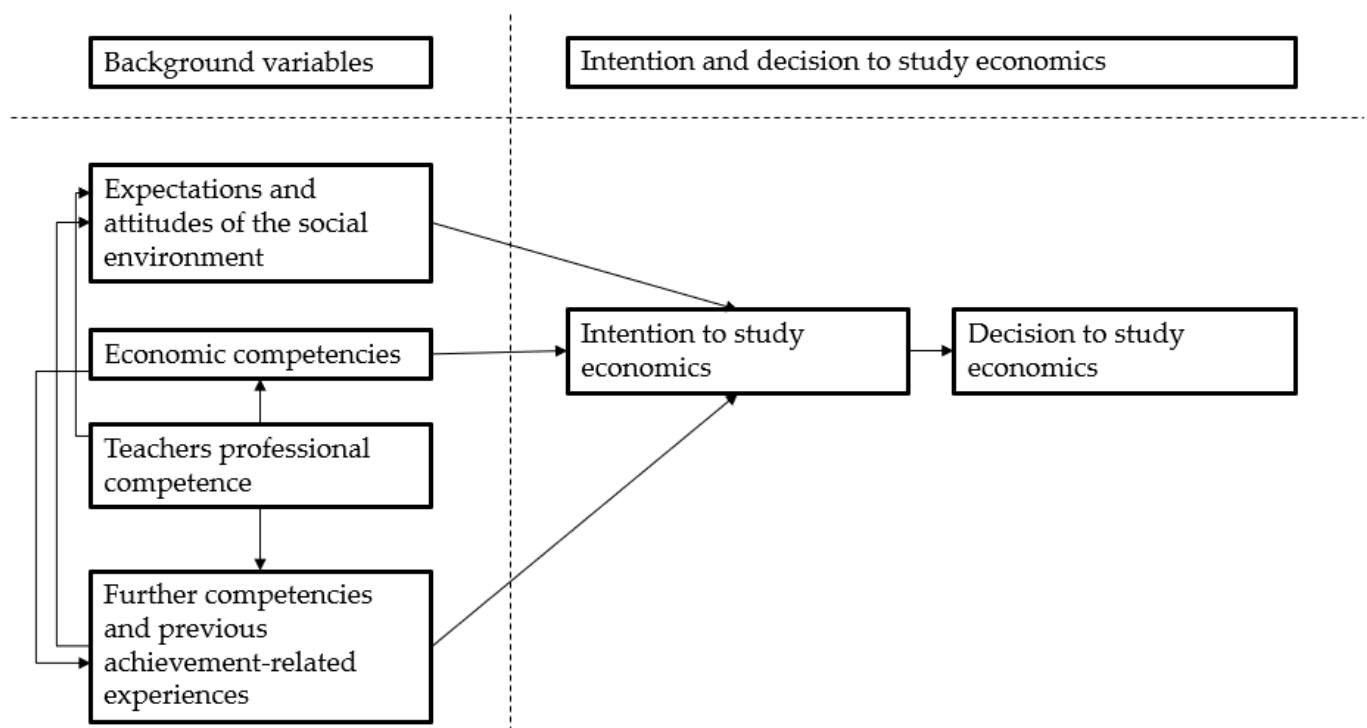


Figure 1. Adjusted and Simplified Expectancy–Value Model Following [Eccles and Wigfield \(2002\)](#).

Finally, to explain a certain behavior, aspirations represent a strong mediator for decisions, which is both theoretically justified in many different models (see, e.g., [Ajzen 1991](#); [Eccles and Wigfield 2002](#); [Tinto 1993](#); [Bean 1982](#)) and empirically well proven (e.g., [Eccles and Wigfield 2020](#); [Agger et al. 2018](#); [Bittmann 2022](#)).

Although there are studies that point to positive effects of teachers’ professionalism on students’ long-term outcomes (e.g., [Chetty et al. 2013](#)), there are no studies, to the best of our knowledge, that provide evidence regarding effects on students’ study aspirations and choices in the field of economics. A recent literature review on the role of economics teachers’ professional development on students’ financial literacy in the field of economics was provided by [Compen et al. \(2019\)](#). The review clearly demonstrates the importance of teaching professionalism for the development of economic competencies. Thus, the study

points to an insufficient consideration of the role of the teacher in studies to explain students' outcomes. In particular, the lack of consideration of teacher professional development regarding economics teachers becomes apparent.

2.4. Transitions from School to University in Switzerland

Since this study was conducted in Switzerland, transitions from school to university in this country are briefly described. In Switzerland, there are two main pathways² to universities. The traditional and most common way is via a baccalaureate school (BS; CH: Gymnasium; general track). Only about 20% of a cohort follows this educational track. This track leads to general qualification for university entrance without any restrictions or systematic constraints. This means that students from a BS may choose any course of study at a university in Switzerland. Over 90% of all students with a general qualification for university entrance in Switzerland enter a university within two years after graduation (Swiss Coordination Centre for Research in Education 2018b). Furthermore, all BS students have to choose one advanced course, whereby the subject "Economics and Law" can be taken as either a basic (about two lessons per week, depending on the canton) or an advanced course (about six lessons per week).

The second pathway is built by the federal vocational baccalaureate schools (FVBSs), which were established in 1993 together with the universities of applied sciences (Gonon 2013). In contrast to BS, an FVBS only leads to a domain-specific³ entrance into universities of applied sciences, which are more practically oriented than universities. Students who enter an FVBS are gaining their qualification either consecutively or in parallel to their apprenticeship. About 15% of the cohort is currently graduating from an FVBS, from which about 60% enter a university within two years after graduation (Swiss Coordination Centre for Research in Education 2018b). Similar to BS students, FVBS students are also enrolled in "Economics and Law" (as well as "Accounting") as their main (about four lessons per week) or supplementary subject (about one lesson per week).

2.5. Research Questions and Hypotheses

Following the theoretical considerations regarding the interrelations between teachers' professional knowledge, domain-specific competencies, and study aspirations/decisions, the following research question can be formulated:

What is the influence of the professional knowledge learners perceive in their economics teacher at the end of upper secondary school on their aspiration and choice to study economics?

Based on this question and the theoretical assumptions presented in Figure 1, the following three hypotheses can be derived:

H1. *The professional knowledge that students perceive in their economics teacher is positively interrelated with students' economic competencies.*

H2. *The professional knowledge that students perceive in their economics teacher is positively interrelated with their intention to study economics, mediated by their economic competencies.*

H3. *The professional knowledge that students perceive in their economics teacher is positively influencing their choice of an economics study program mediated by their intention to study economics.*

The following section describes the underlying materials and methods that were used to answer the research question. Regarding this, it is important to note that hypotheses H1 and H2 will be proven based on cross-sectional analyses, while the analysis of H3 also includes longitudinal data that describe students' choices of the field of study. Each of these hypotheses represents a part of the theoretical model presented in a simplified form above (see Figure 1). The path that these three hypotheses represent as a whole is shown graphically in Figure 2.

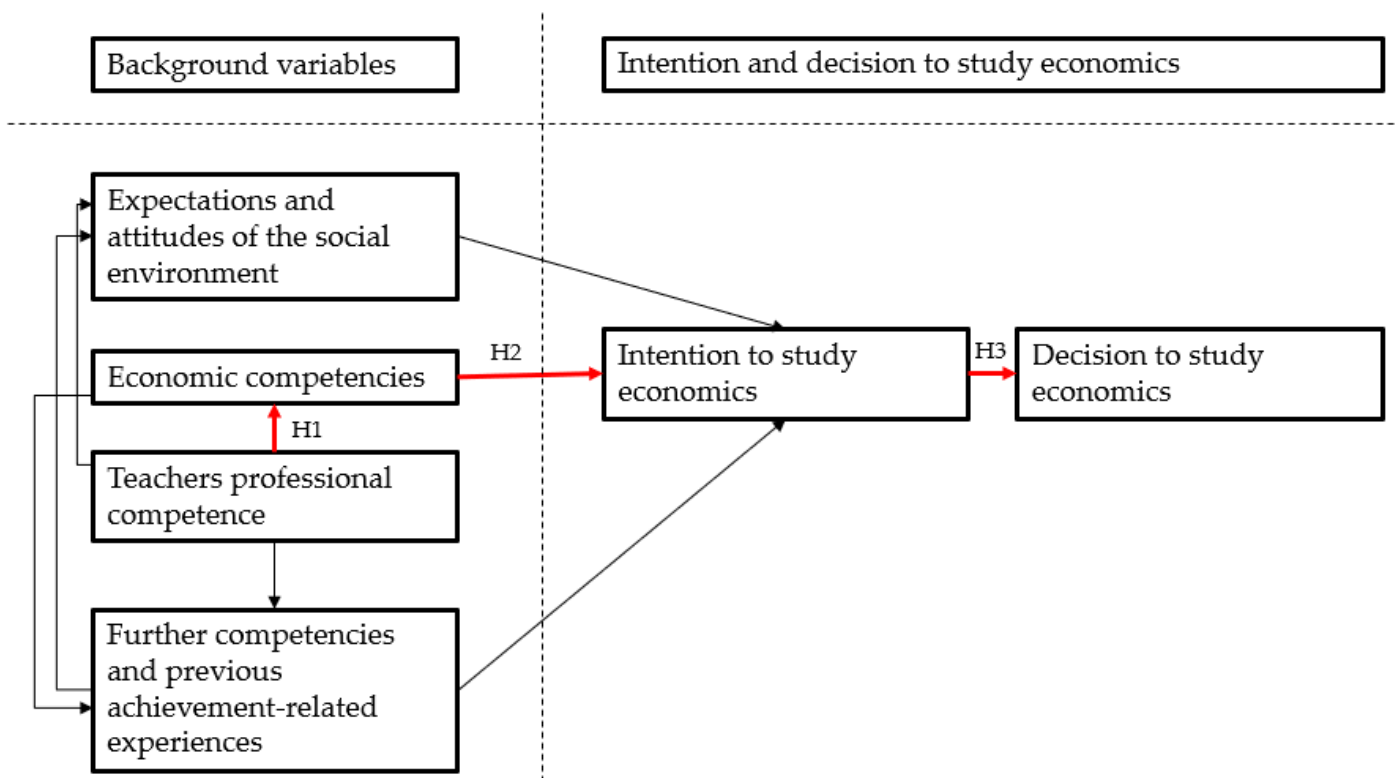


Figure 2. Adjusted and Simplified Expectancy–Value Model with a Theoretically Modeled Path. Notes: H1: Hypothesis 1; H2: Hypothesis 2; H3: Hypothesis 3.

3. Materials and Methods

3.1. Design

The present study follows a longitudinal research design with two points of measurement. The first point of measurement took place in the spring/summer of 2011 in the German-speaking part of Switzerland at the end of the school year, where students were tested and interviewed shortly before they gained their final certificate. The second point of measurement took place about five years later, in the spring/summer of 2016.

At T1, students’ economic, mathematical, and verbal knowledge and skills, as well as their cognitive abilities, were tested (duration: 180 min). Furthermore, further facets of economic competencies (motivation, interest, attitude, and value-oriented dispositions), educational aspirations, the professional knowledge that students perceive in their economics teacher, as well as socio-demographic variables, were surveyed using a paper-based questionnaire. At T2, students’ educational decisions from 2011 to 2016 were surveyed using an online questionnaire as well as a computer-assisted telephone interview (CATI).

3.2. Population, Sample, and Weighting

The population in 2011 was composed of students at the upper-secondary level in the German-speaking part of Switzerland who were attending a school that leads to higher education at the tertiary level.

In 2011 (at T1), the population included 10,091 BS students (584 school classes) and 7150 FVBS students (417 school classes). According to the population, four explicit strata were built in advance for the sampling: (1) BSs with the advanced course “Economics and Law”, (2) BSs with another advanced course, (3) FVBSs with the main subject “Economics and Law”, and (4) FVBSs with another main subject. From each of these strata, 50 classes were drawn randomly. This included 1838 BS and 1802 FVBS students, each group nested in 100 school classes. Besides this, implicit strata were built according to gender, federal canton, and class size.

Finally, 2328 students participated at T1. There were no systematic differences between the school classes and students that participated and the ones that did not (Schumann and Eberle 2014). However, because of the equal distribution regarding the four explicit strata, stratum-specific weights were calculated to ensure proportionality and, therefore, representativeness of the sample (for more details regarding sampling, see Angelone and Berger 2011).

At T2, the students were addressed again. Of the 2328 students, 1600 provided a postal and/or e-mail address, and only 1300 of these addresses were still valid in 2016. Of these 1300 students, 520 students participated at T2 (367 BS and 153 FVBS students). The two samples strongly differed not only according to the different explicit and implicit strata; there was also a strong positive selection bias regarding students' knowledge and skills with small to moderate effects sizes ($d = 0.17\text{--}0.47$) between students who participated at T2 and students that did not participate. To fix these drop-out effects, inverse-probability weighting on the basis of the identified drop-out variables was used to calculate individual weights (Brick and Montaquila 2009). To prevent overweighting, 10 individual weights were trimmed using four times the median weight (see Kish 1992). After weighting, only one difference remained significant with a small effect size ($d = 0.27$).

Since only BS students can freely choose their field of study and are not affected by formal constraints, only this group is considered in the analyses of this study.

The unweighted and the weighted subsample with all BS students are presented in Tables 1 and 2.

Table 1. Longitudinal sample (unweighted).

	Classes	Students	Gender		Age	
	n1	n2	Female	Male	M	SD
BS (Economics and Law)	36	188 (36%)	84 (45%)	104 (55%)	23.5	0.7
BS (Other)	41	179 (35%)	112 (63%)	67 (37%)	23.4	0.8
Total	77	367	196	171	23.5	0.7

Table 2. Longitudinal sample (weighted).

	Classes	Students	Gender		Age	
	n1	n2	Female	Male	M	SD
BS (Economics and Law)	36	193	78 (40%)	115 (60%)	23.6	0.8
BS (Other)	41	1204	746 (62%)	458 (38%)	23.6	0.8
Total	77	1397	824 (59%)	573 (41%)	23.6	0.8

3.3. Measurement Instruments

Table 3 gives an overview of the measurement instruments of the study for the two points of measurement.

Table 3. Measurement instruments.

	Variable	Items	Scale	Reliability	Source
Professional knowledge that students perceive in their teacher ^a	Content knowledge	3	4-point Likert scale	0.78	Seeber and Squarra (2003)
	Pedagogical content knowledge	3	4-point Likert scale	0.77	Baumert et al. (1997); Eberle et al. (2009); Fend and Specht (1986)
	Pedagogical/psychological knowledge	10	4-point Likert scale	0.80	Baumert et al. (1997); Eberle et al. (2009); Fend and Specht (1986); Moos and Trickett (1974); Fraser (1980)

Table 3. Cont.

	Variable	Items	Scale	Reliability	Source
Economic competence ^a	Knowledge and Skills	111 *	WLE	0.75	Schumann and Eberle (2014)
	Intrinsic Motivation	4	4-point Likert scale	0.82	Eberle et al. (2009); Prenzel et al. (1996)
	Interest	3	4-point Likert scale	0.77	Eberle et al. (2009); Prenzel et al. (1996)
	Attitude	14	5-point Likert scale	0.90	Beck (1993)
	Value-oriented dispositions	9	4-point Likert scale	0.76	Eberle et al. (2009)
Further individual skills ^a	Mathematical skills	59 *	WLE	0.81	Eberle et al. (2008)
	Verbal skills	91 *	WLE	0.81	Eberle et al. (2008)
	Cogn. abilities	45 *	WLE	0.78	Heller and Perleth (2000)
	Average school grade	3	Ordinal (6 to 1)	-	-
Other variables ^a	Socio-economic background	4	(H)ISEI-Index	0.79	Ganzeboom et al. (1992)
	Gender (0 = female, 1 = male)	1	Dichotomous	-	-
	Advanced course (0 = Other, 1 = Ec. and Law)	1	Dichotomous	-	-
Decisions	Study aspiration (0 = Other, 1 = Ec.) ^a	2	Dichotomous	-	Swiss Federal Statistical Office (2018, 2019)
	Choice of the field of study ^b	2	Dichotomous	-	Swiss Federal Statistical Office (2018, 2019)

Notes: * multi-matrix booklet design; ^a Measured at T1; ^b measured at T2.

To measure the *professional knowledge* that students perceive in their economics teacher, three dimensions (content knowledge, pedagogical content knowledge, and pedagogical/psychological knowledge) were surveyed. Each of these three dimensions was measured one-dimensionally with satisfactory reliability (see Table 3). Table 4 presents an exemplary item for each dimension.

Table 4. Exemplary items for professional knowledge that students perceive in their teacher.

Further Facets of Economic Competence	Exemplary Item (Translated)
Content knowledge	Our teacher in Economics and Law can give an answer to any subject-related question.
Pedagogic content knowledge	Our teacher in Economics and Law can explain the content of our lessons clearly and comprehensively.
Pedagogic knowledge	Our teacher in Economics and Law immediately notices when some of us begin to disrupt the lesson.

The *economic competencies* of the students were measured based on five dimensions: economic knowledge and skills, intrinsic motivation, interest, attitude toward economics, and value-oriented dispositions. To measure economics knowledge and skills, a performance test consisting of 111 items in total was used. Since the aim of this test is to measure students' general understanding of societally relevant economic issues, these items were not strictly developed on the basis of school curricula. Instead, the basis for the item devel-

opment was built by a comprehensive media analysis of approximately 1400 newspaper articles. Based on this analysis, about 30,000 economic terms could be identified, and these terms were related to three sub-domains: economics, business administration, and accounting. These led to the development of 111 items that could be allocated to these three subdomains. To solve these items, the participants received modified newspaper articles. These formed the basis of a proper context in which the students had to answer 4–8 questions (mainly multiple-choice questions), which were partly related to the modified newspaper article. The whole test instrument was conceptualized as a multi-matrix booklet design that consisted of 21 newspaper articles implemented in six different test booklets (for details, see Schumann and Eberle 2014). Based on confirmatory factor analyses (CFT), there is no empirical evidence of the superiority of a three- or two-dimensional model against a one-dimensional model (ibid.). Therefore, for simplicity of the overall model, the one-dimensional solution for economic knowledge and skills was used. To estimate students’ individual knowledge and skills, weighted likelihood estimation (WLE; see Warm 1989) was used based on item response theory (IRT) with the software program “ConQuest” (Wu et al. 2007). Therefore, a one-dimensional Rasch model was calculated (see Rasch 1980).

The further facets of economic competence (motivation, interest, attitude, and value-oriented dispositions) were surveyed by a paper-based questionnaire with a 4–5-point Likert scale (1 = “totally disagree” to 4/5 = “totally agree”) and with satisfactory to good reliability (see Table 3). Exemplary items of these four scales are presented in Table 5.

Table 5. Exemplary items for the further facets of economic competence.

Further Facets of Economic Competence	Exemplary Item (Translated)
Intrinsic motivation	Within lessons in economics and law, time often flies by.
Interest	Within lessons in economics and law, I am often confronted with interesting issues.
Attitude	I like to read articles about economic issues.
Value-oriented disposition	I think that solutions to economic issues also depend on the personal attitudes of those involved.

As control variables, mathematical and verbal skills, as well as cognitive abilities, were tested. To test mathematical and verbal skills, sub-tests of a nationwide evaluation study of educational reforms of the Matura in Switzerland (see Eberle et al. 2008) were used. To measure cognitive abilities, the “KFT 4–12 + R” test by Heller and Perleth (2000) was used. To estimate the individual skills and abilities, again, WLEs were calculated using the program software “ConQuest” (see above) with good reliability (see Table 3). Similar to the test of economic knowledge and skills, these three tests were implemented in a multi-matrix booklet design. In addition to the three performance tests, school grades in mathematics, first language (here, German), and Economics and Law were asked using a paper-based questionnaire. School grades in Switzerland are rated from 6 (“very good”) to 1 (“failed”), and students typically need an average grade of at least 4 (“passed”) to graduate from school. The average school grade is calculated by the mean of the three school grades. Further control variables comprise students’ socio-economics background, advanced subject in school, and gender. The socio-economic background was measured by the Highest International Socio-Economic Index of Occupational Status (HISEI), which is calculated by the maximum of the occupational status of students’ parents. Accordingly, students were asked for their parents’ job titles and job descriptions. Based on this, the HISEI ranges from 0 (“lowest possible occupational status”) to 100 (“highest possible occupational status”). The inter-rater reliability of the HISEI with four different and independent raters shows good reliability (see Table 3). Gender and advanced subject

are dichotomous variables based on students' biological gender or, respectively, chosen advanced course (Economics and Law vs. another advanced school course).

Study aspiration was surveyed at T1. Here, students were asked whether they wanted to study after school and what they wished to study most and second most. *Study choices* were measured five years later using an online questionnaire as well as CATI. In the present study, the first study that was chosen after graduating from school is focused on. The stated courses of study at T1 and T2 were assigned to a specific field of study using the official catalogs for universities of the Swiss Federal Statistical Office (see [Swiss Federal Statistical Office 2018, 2019](#)). The different fields are as follows: (1) humanities and social sciences, (2) business and economics, (3) law, (4) medicine, (5) exact and natural sciences, and (6) other (e.g., interdisciplinary fields of study, teacher training programs, healthcare, and physical education). Both study aspiration and study choices were dichotomized as follows: If a student wished to study and indicated business and economics, it was rated as 1 ("wish to study economics"); otherwise, it was rated as 0 ("no wish to study economics"). For the choice of the field of study, only the field of study that students had chosen at first after graduation was considered, and this was rated as 1 ("economics") or 0 ("other field of study").

3.4. Missing Values

Considering the sample represented in Table 1, missing values (item non-response) for cognitive abilities, mathematical and verbal skills, and the further facets of economic competencies could be identified with a missing rate of 23–30% on the individual level. Based on the pattern of missing and observed values, Missing At Random (MAR) must be assumed. Thus, the missing values were imputed based on the observed values by multi-level multiple imputation using chained equations. To calculate this model, the R package *mice*, and the function *mice.2l.pan* were used ([van Buuren and Groothuis-Oudshoorn 2011](#)). This model enabled the consideration of school classes as cluster variables, fixed and random effects, and class mean effects of individual cognitive variables. Furthermore, the individual weights calculated previously were included within the chained equations. Based on this imputation model, at least 10 predictors were used per outcome variable to calculate 20 estimators for each missing value (for more details, see [van Buuren and Groothuis-Oudshoorn 2011](#); [Rubin 1987](#)).

3.5. Analyses

To answer the research question, different analyses are performed. In the first step, descriptive and bivariate analyses serve as a basis to gain an understanding of the distribution and bivariate interrelations between the different variables within the model. In the second step, a path model is calculated based on the theoretical assumptions. The different hypotheses are systematically tested following these analyses. In the path model, the professional knowledge that students perceive in their economics teacher is modeled as the independent variable. Additionally, economic competence and study aspirations are modeled as mediators between students' perceptions of their economics teachers' professional knowledge and the choice of an economics study program (dependent variable). Students' mathematical and verbal skills, cognitive abilities, school grades, gender, socio-economic background, and advanced school course are modeled as control variables. Because of strong interdependencies between the further facets of economic competence and the complexity of the path model, these were modeled as one dimension. Therefore, the complexity of the model could be significantly reduced. WLE estimators for economic knowledge and skills, mathematical and verbal skills, and cognitive abilities were standardized by a mean of zero and a standard deviation of one.

In contrast to the test results (economic knowledge and skills, mathematical and verbal skills, and cognitive abilities), scales for the different constructs (professional knowledge perceived in the economics teacher, interest in economics, etc.) were calculated on the basis of classical test theory (CTT). The assumption of CTT is that the measurement error negates

itself over the number of measurements. On this basis, the mean values from the individual items were determined for scaling.

For non-standardized descriptive statistics, SPSS (Statistical Package of the Social Sciences), Version 28, was used. For all other analyses, MPlus Version 8.0 (see [Muthén and Muthén 2017](#)) was used.

As previously mentioned, only BS students were integrated into the analyses. FVBS students were excluded because of the strong structural constraints regarding their choice of study program.

3.6. Nested Data Structure

Since students were nested within classes at T1, the standard errors of the estimators within the models were adjusted by using school classes as the cluster variable. Furthermore, maximum likelihood estimation with robust standard errors (MLR, “Sandwich Estimator”, [Muthén and Muthén 2017](#); [Maydeu-Olivares 2017](#); [Finney and DiStefano 2006](#)) was used to calculate standardized estimators within the path model.

3.7. Model Identification

To calculate the model fit of the path model, the following indices were adopted: chi-square (χ^2) and degrees of freedom (df), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Since model fit indices have their specific advantages and disadvantages, the use of different indices is helpful to better interpret the “true” fit of the model (for more details, see [West et al. 2012](#)). Since economic competencies, the professional knowledge that students perceive in their economics teacher, and study aspiration were measured at T1; it was necessary to calculate equivalent models that consider different arrangements of these factors as dependent and independent variables (e.g., [Williams 2012](#)). However, considering the model fit indices, these were not superior to the analysis model that is based on the theoretical assumptions presented in Figure 1.

4. Results

4.1. Descriptive Statistics

Table 6 presents descriptive statistics of the variables that are part of the analysis model. Considering the professional knowledge that students perceive in their economics teacher, students rated their teachers’ professional knowledge relatively high, especially their content knowledge. In contrast, students’ economic competencies are closer to the theoretical center of 2.5 and 3.0, depending on the Likert scale that was used for the further facets of economic competencies.

Table 6. Descriptive statistics.

	Variable	Mean	SD
The professional knowledge students perceive in their teacher	Content knowledge	3.4	0.60
	Pedagogical content knowledge	3.2	0.68
	Pedagogical/psychological knowledge	2.6	0.50
Students’ economic competencies	Knowledge and Skills	0.0	1.00
	Intrinsic Motivation	2.6	0.66
	Interest	2.6	0.62
	Attitude	3.4	0.71
	Value-oriented dispositions	2.8	0.51

Table 6. Cont.

	Variable	Mean	SD
Further individual skills	Mathematical skills	0.0	1.00
	Verbal skills	0.0	1.00
	Cognitive abilities	0.0	1.00
	Average school grade	4.7	0.43
Further variables	Socio-economic background	66.5	16.5
	Gender (0 = female, 1 = male)	0.41	0.49
	Advanced course (0 = Other, 1 = Ec. and Law)	0.14	0.35
Decisions	Study aspiration (0 = Other, 1 = Ec.)	0.13	0.37
	Choice of the field of study	0.18	0.38

The socio-economic background (HISEI) of this sample was about 10 points higher compared to the average value of Switzerland or the OECD average (see, e.g., [Swiss Coordination Centre for Research in Education 2018a](#)).

Finally, considering students’ educational decisions, about 13% wished to study economics, and 18% finally chose economics as their first field of study after graduation. These descriptive results are in line with the data of other sources, e.g., the Swiss Federal Statistical Office (for a summary, see [Swiss Coordination Centre for Research in Education 2018b](#)). Here, entry rates between 15% and 20% for economics between 1985 and 2016 are reported (*ibid.*, p. 203). The number of students with the advanced course “Economics and Law” is a little bit higher, with about 20% in 2015/2016 (*ibid.*, p. 147 ff.).

Tables 7–9 represent descriptive statistics of group variables (gender and advanced course) and their educational decisions (study aspirations and choice of field of study). As described in Tables 7 and 8, it becomes obvious that male students are more likely to choose economics than female students. Furthermore, students with the advanced school course “Economics and Law” are more likely to choose economics than students with another advanced course.

Table 9 shows that students who wished to pursue a field other than economics most likely chose to do so. However, there is a substantial number of students who wished to study economics but chose another field after graduation.

Table 7. Gender and study choices.

	Economics	Gender		Other	Gender	
	n (%)	Male	Female	n (%)	Male	Female
Study aspiration	187 (13.4)	136 (23.7)	51 (6.2)	1210 (86.6)	437 (76.3)	773 (93.8)
Study choice	246 (17.6)	161 (28.1)	85 (10.4)	1151 (82.4)	412 (71.9)	738 (89.6)

N = 1397

Table 8. Advanced school course and study choices.

	Other Advanced Course	Advanced Course: “Economics and Law”
Study aspiration “Economics”	114 (9.4%)	73 (38.0%)
Study choice “Economics”	174 (14.5%)	72 (37.2%)

N = 1397

Table 9. Study aspiration and choice of the field of study.

	Other Study Choice	Study Choice: “Economics”	
Other study aspirations	1089 (90%)	121 (10%)	1210 (100%)
Study aspiration: “Economics”	62 (33%)	125 (67%)	187 (100%)
<i>Total</i>	1150	246	1397

4.2. Inferential Statistics

To answer the research questions, bivariate analyses were performed in the first step. These are used to shed light on the relationships between individual variables before considering them in an overall model.

Table 10 presents the correlations of the independent variables of the model. There are moderate to strong correlations between the different dimensions of perceived professional knowledge as well as the further facets of economic competencies. Additionally, the professional knowledge that students perceive in their economics teacher is positively interrelated with further facets of economic competencies but not with cognitive dispositions, which are more performance-oriented, such as economic knowledge and skills or cognitive abilities. In this regard, it becomes obvious that a higher perception of teachers’ professional knowledge most strongly interrelates with domain-related motivational or affective variables. In contrast, economic knowledge and skills positively interrelate with further skills, e.g., mathematical skills or school grades. Considering the socio-economic background, there is only a small negative interrelation with economic knowledge and skills, showing that students with a lower socio-economic background show higher economic knowledge and skills. The reason for this small interrelation might be because of the relatively strong selection of Swiss students at the end of lower secondary education. Considering gender and the advanced school course, there are moderate interrelations regarding economic competencies. Thereby, male students and students with the advanced school course “Economics and Law” showed higher economic knowledge and skills and a more positive attitude towards economics.

Besides the specific interrelations between the independent variables represented in Table 10, differences between students who wished to study (see Table 11) or who chose a course in the field of economics (Table 12) are of special interest. These analyses offer specific insights into the interrelations between the independent variables and study aspirations/choices.

Table 10. Interrelations between independent variables.

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Perc. prof. knowledge	(1) Content knowledge	1	.71 **	.34 **	.05	.27 **	.21 *	.15 *	.17 *	−.05	−.05	.02	−.01	.01	.06	.04
	(2) Pedagogical content knowledge		1	.35 **	.04	.32 **	.29 **	.21 **	.23 **	−.03	−.09	−.01	−.04	−.03	.01	−.06
	(3) Pedagogical/psychological knowledge			1	.03	.18 *	.20 *	.14 **	.16 *	.01	.05	−.01	−.04	.07	−.03	−.10
Economic competence	(4) Economic Knowledge and Skills				1	.12	.14 *	.36 **	.21 *	.02	.22 **	.25 **	.13 **	−.13 **	.34 **	.33 **
	(5) Intrinsic Motivation					1	.64 **	.56 **	.26 **	.02	−.03	.09	.06	.04	.03	.06
	(6) Interest						1	.58 **	.46 **	−.03	−.06	.05	.11	.07	.10	.06
	(7) Attitude							1	.41 **	.01	−.08	.07	.18 *	.01	.30 **	.24 **
Further individual skills	(8) Value-oriented dispositions								1	−.04	.01	.02	.01	.05	−.01	.17 **
	(9) Mathematical skills									1	.06	.33 **	.25 **	−.05	.23 **	−.07 *
	(10) Verbal skills										1	.16 *	.14 **	−.03	−.03	.04
	(11) Cognitive abilities											1	.26 **	−.07	.20 **	−.04
Further variables	(12) Average school grade												1	.01	.02	−.05
	(13) Socio-economic background													1	−.02	.02
	(14) Gender (0 = female, 1 = male)														1	.15 **
	(15) Advanced course (0 = Other, 1 = Ec. and Law)															1

Notes: * $p < .05$; ** $p < .01$.

Table 11. Group differences of students with and without the aspiration to study economics.

Variable		Study Aspiration "Economics"		Study Aspiration "Other"		T	p	d
		M	SD	M	SD			
Perceived professional knowledge	Content knowledge	3.52	0.594	3.35	0.594	2.460	<.01	0.29
	Pedagogical content knowledge	3.41	0.722	3.16	0.712	2.892	<.01	0.35
	Pedagogical knowledge	2.71	0.498	2.61	0.514	1.451	.043	0.2
Economic competencies	Economic knowledge and skills	1.01	0.843	−0.16	0.930	16.064	<.01	1.27
	Intrinsic motivation	3.00	0.612	2.54	0.646	5.102	<.01	0.72
	Interest	3.04	0.474	2.53	0.613	7.853	<.01	0.89
	Attitude	4.12	0.463	3.25	0.670	10.988	<.01	1.35
	Value-oriented disposition	3.04	0.453	2.82	0.510	3.325	<.01	0.44

Table 12. Group differences of students who chose economics or another field of study.

Variable		Study Aspiration "Economics"		Study Aspiration "Other"		T	p	d
		M	SD	M	SD			
Perceived professional knowledge	Content knowledge	3.50	0.583	3.34	0.596	2.295	<.01	0.27
	Pedagogical content knowledge	3.37	0.641	3.15	0.687	2.939	<.01	0.32
	Pedagogical knowledge	2.60	0.527	2.63	0.510	−0.348	.186	0.06
Economic competencies	Economic knowledge and skills	0.56	1.140	−0.12	0.926	8.682	<.01	0.71
	Intrinsic motivation	2.72	0.654	2.57	0.660	1.537	.056	0.23
	Interest	2.84	0.564	2.55	0.620	3.362	<.01	0.47
	Attitude	3.74	0.686	3.28	0.690	5.394	<.01	0.67
	Value-oriented disposition	3.03	0.438	2.81	0.513	3.184	<.01	0.44

Tables 11 and 12 present independent t-tests both with two samples: first, BS students who wished or did not wish to study economics, and second, BS students who chose or did not choose economics. Considering economic competencies, there are strong differences between BS students who wish to study economics or choose economics compared to students with other study aspirations or other study choices. Additionally, there are also moderate to strong effects between those groups regarding the professional knowledge perceived in their economics teacher. Considering those strong differences, the following questions arise: How do economic competencies and professional knowledge perceived by the economics teacher interrelate with students' aspirations to study economics? How do these variables influence their choice of studying economics after school?

In this regard, Figure 3 presents the path model that is based directly on the theoretical model presented in Figure 2. It is important to note that economic competencies are modeled as a mediator between student characteristics (including the professional knowledge perceived by their economics teacher) and their aspiration to study economics. Study aspiration, in turn, functions as a mediator between students' economic competencies and their choice of an economics study program. Therefore, economic competencies and study aspiration function as both an independent and a dependent variable. Another important adjustment is that the further facets of economic competencies must be modeled as one

dimension to (1) avoid multicollinearity and (2) reduce the complexity of the path model. To make the path model more accessible, only the path coefficients that are relevant for testing the hypothesis are shown. Thus, for clarity, the path coefficients that relate to the research questions are numbered and highlighted in bold. An overview of all direct and indirect effects can be found in Tables 13 and 14. The content-related justification for the relationships made in this path model can be found in the theoretical part of this paper, as well as the theoretical model presented in Figure 2.

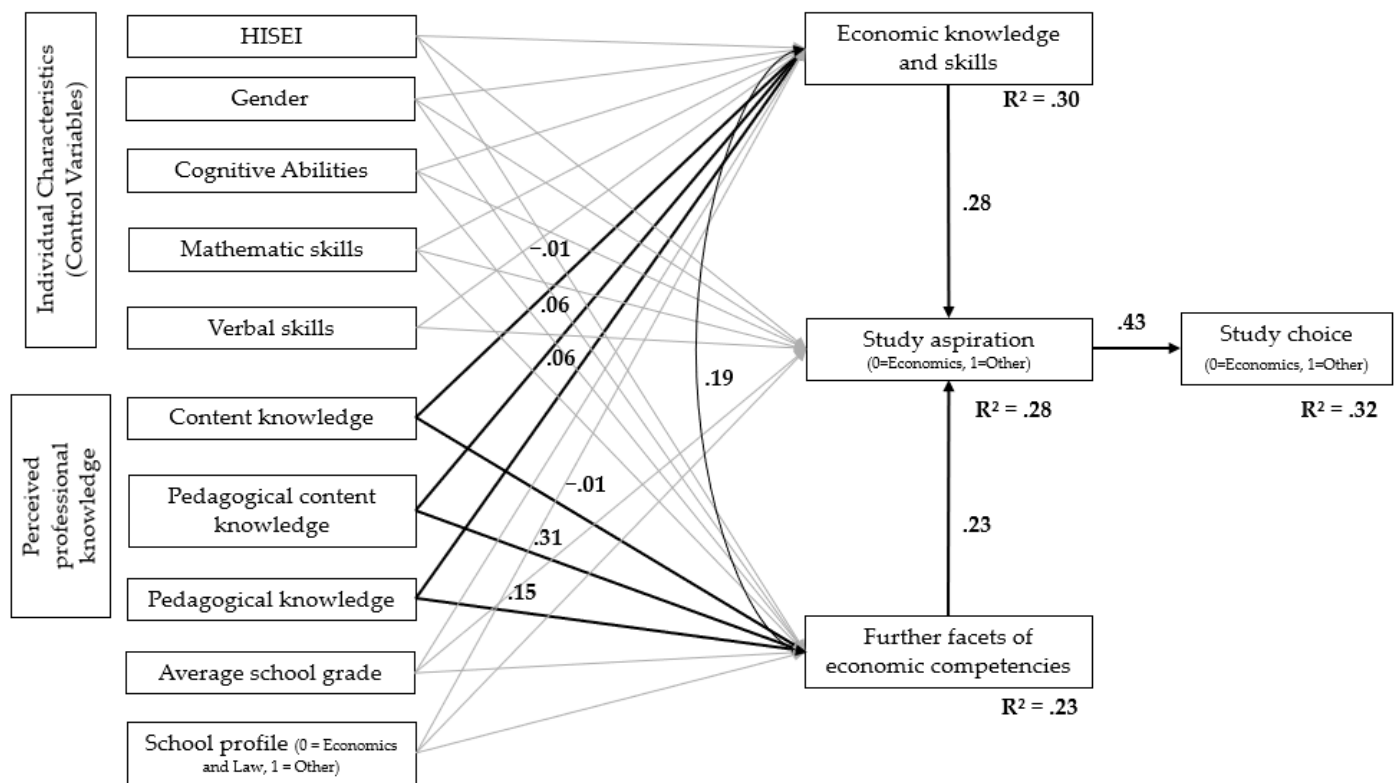


Figure 3. Path model for the influence of economic competencies and perceived professional knowledge on the aspiration and choice of an economics study course. Model fit indices: $\chi^2 = 22.2$, $df = 15$; RMSEA = 0.034, CFI = 0.97; TLI = 0.92; SRMR = 0.023.

Table 13. Direct effects of the path model.

Category	Variable	Economic Knowledge and Skills	Further Facets of Economic Competencies	Intention to Study Economics (0 = Other, 1 = Economics)	Decision to Study Economics (0 = Other, 1 = Economics)
Perc. prof. knowledge	Content knowledge	-.01	-.01	-	-
	Pedagogical content knowledge	.06	.31 **	-	-
	Pedagogical knowledge	.06	.15	-	-
Individual skills	Mathematical skills	-.11	-.06	-.06	-
	Verbal skills	.21 **	-.05	-.08	-
	Cognitive abilities	.18 *	.05	.02	-
	Average school grade	.10 †	.16	-.03	-

Table 13. Cont.

Category	Variable	Economic Knowledge and Skills	Further Facets of Economic Competencies	Intention to Study Economics (0 = Other, 1 = Economics)	Decision to Study Economics (0 = Other, 1 = Economics)
Further ind. variables	Gender (0 = female, 1 = male)	.28 **	.12	.11 *	-
	Socio-economic background	-.12 *	.05	.03	-
	Advanced course (0 = Other, 1 = Ec. and Law)	.27 **	.19 **	.14 **	-
Ec. competence	Economic knowledge and skills	-	-	.28 **	-
	Further facets of economic competence	-	-	.24 **	-
Aspiration	Intention to study economics (0 = Other, 1 = Economics)	-	-	-	.51 **
	R ²	.30	.23	.28	.26

Notes: † $p < .10$; * $p < .05$; ** $p < .01$.

Table 14. Total indirect effects of the path model.

Category	Variable	Intention to Study Economics (0 = Other, 1 = Economics)	Decision to Study Economics (0 = Other, 1 = Economics)
		Total Indirect/Total	Total Indirect/Total
Perc. prof. knowledge	Content knowledge	<.01/<.01	<.01
	Pedagogical content knowledge	.10 †/.10 †	.05 †
	Pedagogical knowledge	.05/.05	.03
Individual skills	Mathematical skills	-.05/-.11	-.06
	Verbal skills	.05/-.03	-.02
	Cognitive abilities	.06 †/.08	.04
	Average school grade	.07 */.03	.02
Further ind. variables	Gender (0 = female, 1 = male)	.11 **/.22 **	.11 **
	Socio-economic background	-.02/.01	<.01
	Advanced course (0 = Other, 1 = Ec. and Law)	.12 **/.26 **	.13 **
Ec. competence	Economic knowledge and skills		.14 **
	Further facets of economic competence		.13 **

Notes: † $p < .10$; * $p < .05$; ** $p < .01$.

The results of the path model show a moderate effect of the professional knowledge that students perceive in their economics teacher on further facets of economic competencies. This indicates that the pedagogical content knowledge of the economics teacher is positively correlated with student interest, motivation, attitude, and/or value-oriented dispositions regarding economics. The same accounts for the perceived pedagogical knowl-

edge with a small effect size. However, there are no interrelations between the perceived content knowledge and the further facets of economic competencies. Additionally, the professional knowledge students perceive in their teacher is uncorrelated with economic knowledge and skills. This strongly indicates that the teacher's professional knowledge, especially their pedagogical content knowledge, plays a significant role regarding the facets of economic competencies that goes beyond performance-oriented dispositions (e.g., interest and motivation). Thus, H1 can only partly be confirmed. Considering economic knowledge and skills, students' advanced school course, gender, and verbal skills are most relevant. Here, male students, students with the advanced school course "Economics and Law", and students who have better verbal skills show higher economic knowledge and skills. Following the further path coefficients, students' economic competencies are good predictors for students' intentions to study economics, with a moderate effect size. Because of this, the indirect effects of gender, the advanced school course, and the pedagogical content knowledge become significant with small effect sizes. Therefore, a mediating function of economic competencies can be assumed. Consequently, H2 can also partly be confirmed. However, considering the cross-sectional design of T1, the path model is not able to fully verify this assumption. As expected, students' intention to study economics is a strong mediator in a student's decision to study economics. There are significant total indirect effects of gender, the advanced school course, and economic competencies, with small effect sizes. The total indirect effects of professional knowledge are very small, close to zero. Thus, H3 can only be confirmed with regard to pedagogical content knowledge. However, considering the manifest modeling and time span between T1 and T2, these effect sizes should not be underestimated.

In summary, the professional knowledge perceived is mainly related to students' economic competencies and indirectly to their intentions. To explain students' decisions, economic competencies are most relevant, whereby the indirect influence of the perceived professional knowledge only plays a minor role.

5. Discussion

At the beginning of this paper, it was highlighted that "a fundamental interest of [...] transition research is [...] to make the transition from school to university and into the work as fitting as possible". This study emphasizes the role of the economics teacher who supports this process. Regarding this, the present study focused on answering the question of how the professional knowledge that students perceive in their economics teacher by the end of upper secondary school influences their aspiration and choice to study economics at university. Therefore, three hypotheses were formulated and systematically analyzed.

While the testing of hypothesis H1 initially refers to the investigation of the interrelation between the professional knowledge that students perceive in their economics teacher and their economic competencies, it will be discussed separately from hypotheses H2 and H3, which focus on the influence on the aspiration and choice of an economics study program.

5.1. Professional Knowledge and Economic Competencies

Regarding H1, results of bivariate analyses showed that the three dimensions of the professional knowledge that students perceive in their economics teacher are only interrelated with their interest, motivation, attitude, and value-oriented dispositions regarding economics, with a small to moderate effect size, but not with their economics knowledge and skills. This also becomes obvious within the multivariate path model, showing small to moderate effects of pedagogical content knowledge and pedagogical knowledge. There is no effect of perceived content knowledge on economic competencies within the path model. It is obvious that the teacher's professional knowledge most strongly affects motivational or affective facets of economic competencies. In this respect, domain-specific knowledge has a subordinate position for both teachers (perceived content knowledge) and students (economic knowledge and skills). This is consistent with analyses based

on the PISA study (Kunter et al. 2013; Krauss et al. 2008). However, different studies in the field of economics point to positive effects on students' economic competencies (e.g., Dills and Placone 2008; Allgood and Walstad 1999; Compen et al. 2021), which is contrary to the missing effect on economic knowledge and skills. A possible explanation must be seen in the fact that teachers' knowledge can only be seen as predictive of teaching quality and the associated learning process to a certain extent. Content knowledge builds a necessary condition for pedagogical content knowledge, but beyond a basic knowledge level, the effects of content knowledge become smaller (see, e.g., Kunter 2011). In this regard, it must be emphasized that many of the studies that find positive effects on students' economic knowledge are either focused on specific training for knowledge development or related to the use of a specific instructional approach (e.g., problem-based learning approach, see Maxwell et al. 2005). The main aim of these studies is to address the insufficient economic knowledge of economics teacher. However, since only the perceptions of students were surveyed, these results can only be applied to a limited extent. Regardless of this, the findings once again emphasize the importance of a high level of professional knowledge in order to foster students' economic competencies.

Consequently, H1 can only be confirmed for facets of economic competencies other than cognitive performance skills and only for pedagogic content knowledge.

5.2. Professional Knowledge and Transition to an Economics Study Program

The role and function of teaching professionalism can be given further significance with regard to the choice of field of study. Bivariate analyses showed moderate to strong differences regarding economic competencies between students who wished to study economics and those who did not—the same counts for students who decided to study economics or not. This is not surprising, but it confirms that students are striving to choose a field of study that fits their personal skills, interests, and attitudes. Multivariate analyses provide further evidence that economic competencies by the end of upper secondary school play an important role in the choice of an economics study program (see also Jüttler and Schumann 2019). In this regard, it is important to note that mathematical or verbal skills do not sufficiently explain students' intention/choice of an economics study program.

Considering H2 and H3, the model-specific extension of professional knowledge shows similar results. Students with the intention to choose economics and students who decided to study economics showed a higher perception of their economics teachers' professional knowledge, with a moderate to strong effect size. Within the path model, only pedagogic content knowledge becomes predictive. However, it is important to emphasize that the effects of pedagogic content knowledge are valid, regardless of school profile, economic competencies, socioeconomic background, and further skills (e.g., mathematical performance or cognitive abilities). The importance of the teachers' pedagogic content knowledge and its domination is an important finding. Similar to H1, H2 and H3 can only be confirmed for pedagogic content knowledge. Thus, economics teachers' professional knowledge offers an incremental contribution to explaining students' intentions and choice of an economics study program.

5.3. Summary

In summary, the confirmation of H1–H3 for pedagogic content knowledge provides important empirical information about the relevance of a domain-specific didactic for economics teachers. This is of particular importance against the backdrop of increasing criticism of the qualification of economics teachers (for an overview, see, e.g., Compen et al. 2019), as mentioned in the introduction of this paper. In this context, the extent to which a domain-specific didactic is necessary for the subject of economics and what legitimizes it is often questioned. A fundamental problem of this discussion must be seen in the fact that it lacks any empirical basis and tends to be conducted on the basis of subjective theories. This makes the contribution of the present study even more important because it emphasizes the role of the economics teacher as an important function not only for the development

of economic competencies but also for the associated explanation of study aspiration and subject choice. Against this backdrop, researchers discuss the necessity of the continuous development of economics teachers' economic knowledge and instructional experiences by providing special programs, courses, webinars, or other teacher professional development initiatives (see, e.g., [Allgood and Walstad 1999](#); [Compen et al. 2021, 2019](#)). However, despite the great potential of such initiatives, studies that investigate their effectiveness are rare, and their development is often poorly reported (c.f., [Compen et al. 2019](#)).

5.4. Limitations

Besides this, the limitations of the study must be discussed. First of all, since this study focuses on students' perceptions and not on teacher tests of professional knowledge, the extent to which these are comparable must be questioned. Many researchers support the approach of using students' perceptions to predict student outcomes ([Baumert and Kunter 2006, 2013](#); [Helmke 2017](#); [Baumert et al. 2004](#)). In this regard, students' perceptions can be seen as a good indicator of teacher behavior (e.g., [Wagner et al. 2013](#); [Gaertner 2014](#); [Ferguson and Danielson 2015](#); [Goe et al. 2008](#)). However, there are also counterarguments that question the reliability and sophistication of student ratings (e.g., [Lüdtke et al. 2007](#); [Wagner et al. 2013](#); [Kunter and Baumert 2007](#); [Ferguson 2012](#); [De Jong and Westerhof 2001](#); for a further discussion, see also [van der Scheer et al. 2019](#)). With this in mind, numerous influencing factors that have a distorting effect on student perceptions are discussed (e.g., [van der Scheer et al. 2019](#); [Addison and Stowell 2012](#); [Kunter and Baumert 2007](#)). For example, students often tend to make generalized statements and are unable to separate ascriptive personal characteristics (such as sympathy) from other factors (such as the quality of instruction) (e.g., the so-called "halo effect", for further discussions, see, e.g., [Keeley et al. 2013](#); [Clausen 2002](#); [Röhl and Rollett 2021](#)). Furthermore, the multidimensional facets of the theoretically discussed models regarding economics teachers' professional knowledge (see, e.g., [Kuhn et al. 2016](#)) cannot be empirically represented by students' perceptions. In this regard, it remains unclear which facets of economics teachers' pedagogic content knowledge are of major importance. This also emphasizes the importance of future replication studies that consider this multidimensionality. Thus, although there are higher costs, future research should use multiple perspectives to ensure a reliable and valid measurement of teachers' professional knowledge (see [Praetorius et al. 2012](#); [van der Scheer et al. 2019](#); [Kane et al. 2015](#); [Kane and Staiger 2012](#)). In addition, students' perceptions of teachers of other subjects (e.g., mathematics, history, etc.) are not considered within the path model. Thus, for future studies, it would be important to consider students' perceptions of other subjects in order to control for conflicting effects (e.g., the high perceived teaching professionalism of both economics and mathematics teachers).

Another important limitation must be seen in the cross-sectional character of the T1 variables, which include the professional knowledge that students perceive in their economics teacher, economic competencies, as well as study aspirations. From a theoretical perspective, it is assumed that the higher professional knowledge of an economics teacher positively influences students' economic competencies at the end of upper secondary education, which in turn, positively influences their intention to study economics (see [Figures 1 and 2](#)). It is clear that these processes extend over a longer period of time. Measuring a single point is, therefore, not able to adequately depict the temporal sequence. As mentioned in the methods section of this paper, the analysis of equivalent models (see, e.g., [Williams 2012](#)) shows that no model dominates the one defined in this paper with regard to model fit indices. Nevertheless, there is currently a lack of studies that would allow more precise statements to be made here. For this reason, the correlations must not be interpreted causally. A replication of this study that considers the time sequence of this process is strongly recommended. In this regard, from a methodological point of view, it must be emphasized that the different effects of the professional knowledge that students perceive on (a) their economic knowledge and skills and (b) their further facets of economic competencies could partly be attributed to a survey bias. This is because economic

knowledge and skills were measured by a test, whereas the professional knowledge that students perceive in their economics teacher as well as their further facets of economic competencies were measured using a questionnaire by self-reports. Thus, it would be pertinent to measure students' economic competencies as well as economics teachers' professional knowledge before—or at the very beginning—of upper-secondary school and then over time to be able to explain how these are interrelated. By measuring not only the professional knowledge that students perceive in their economics teacher but also their "true" professional knowledge, it would be possible to include a level two (teacher) predictor that more clearly shows the influence of teachers' professional knowledge on individual outcome variables at level one (students).

Finally, it must be critically noted what exactly one means by "economics". This study includes all courses of study that are related to economics in a broader sense, i.e., business administration, economics, etc. Accordingly, the scope of content must be seen as broad and heterogeneous. Obviously, there are strong differences between those courses of study. Therefore, it must be assumed that students differ in their priorities across those different courses. Analyses that make a separate evaluation according to different economic subjects would therefore be desirable and would allow for a differentiated insight. In this study, a general approach was used in order to measure economic competencies, teachers' professional knowledge, and the intention and decision to study economics, which makes it difficult to perform subject-specific analyses that are comparable and that use a subsample that is large enough to perform multivariate path analyses.

6. Conclusions

Regardless of the various limitations, the present study is the first to provide results that represent the interrelations between the professional knowledge of the economics teacher, economic competencies at the end of upper secondary school, and the intention and decision to pursue an economics study program. It, therefore, offers important insights into the role of the economics teacher that is often excluded or only considered to a limited extent within transition research. Thus, the moderate interrelation between economics teachers' professional knowledge and students' interest, motivation, attitude, and value-oriented dispositions regarding economics must be emphasized. These, in turn, are moderately interrelated with the intention to study economics, which is a strong mediator for choosing an economics study program. Accordingly, the economics teacher plays a significant role in a student's decision to study economics. Considering the recent literature review by [Compen et al. \(2019\)](#) and the aforementioned lack of research in this field, it is strongly recommended that the present study be replicated, alongside conducting a literature review that systematically summarizes the findings in this field. Against this backdrop, studies that integrate a domain-specific model of economics teachers' professional knowledge (see, e.g., [Bouley et al. 2015](#)) are recommended.

Additionally, the findings of this study have not only an important practical impact but also an impact on future research. First, teachers' professional knowledge is mostly neglected within theoretical models, which makes it necessary to include this variable. In this regard, this study shows that teachers are an important part of students' social environment that influence students' study aspirations and choices. Furthermore, these findings confirm that teachers play a significant role in students' economic competencies (see, e.g., [Dills and Placone 2008](#)), which are an important predictor for choosing economics at the university level. Therefore, specific theoretical adjustments are necessary to systematically assess teachers' professional knowledge. Second, considering that the pedagogic content knowledge is the strongest predictor, the inadequate training of economics teachers should be brought into focus (see also [Compen et al. 2019](#)). Regarding this, improving teachers' pedagogic content knowledge must be the main target of current education policy in order to adequately meet the increasing demand for qualified economics teachers.

Thus, it is strongly recommended that this study be replicated so as to offer a broader basis of empirical evidence that emphasizes the important role of teachers' professional

knowledge, which goes beyond the student learning processes and has long-term effects, e.g., on educational decisions, competence development, and vocational profession.

Author Contributions: Conceptualization, M.J. and S.S.; methodology, M.J. and S.S.; formal analysis, M.J.; investigation, S.S. and M.J.; data curation, M.J. and S.S.; writing—original draft preparation, M.J.; writing—review and editing, M.J. and S.S.; visualization, M.J.; supervision, M.J. and S.S.; project administration, S.S.; funding acquisition, S.S. and M.J. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the Baden-Württemberg Stiftung (see <https://www.bwstiftung.de/bildung/program-me/hochschule/netzwerk-bildungsforschung/>) under Grant FP017/14 (Duration: 11/2015-10/2016) and the Swiss National Science Foundation (SNSF) under Grant 130301 (Duration: 05/2010-07/2012).

Data Availability Statement: Access to the raw data can be provided upon request. The raw data will be transmitted in encrypted form in order to fulfill the underlying data protection standards.

Acknowledgments: The opinions, results, and conclusions in this paper are those of the authors and are independent of the funding sources. The reported findings serve purely scientific purposes. All authors agreed with the acknowledgments.

Conflicts of Interest: The authors declare that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Appendix A

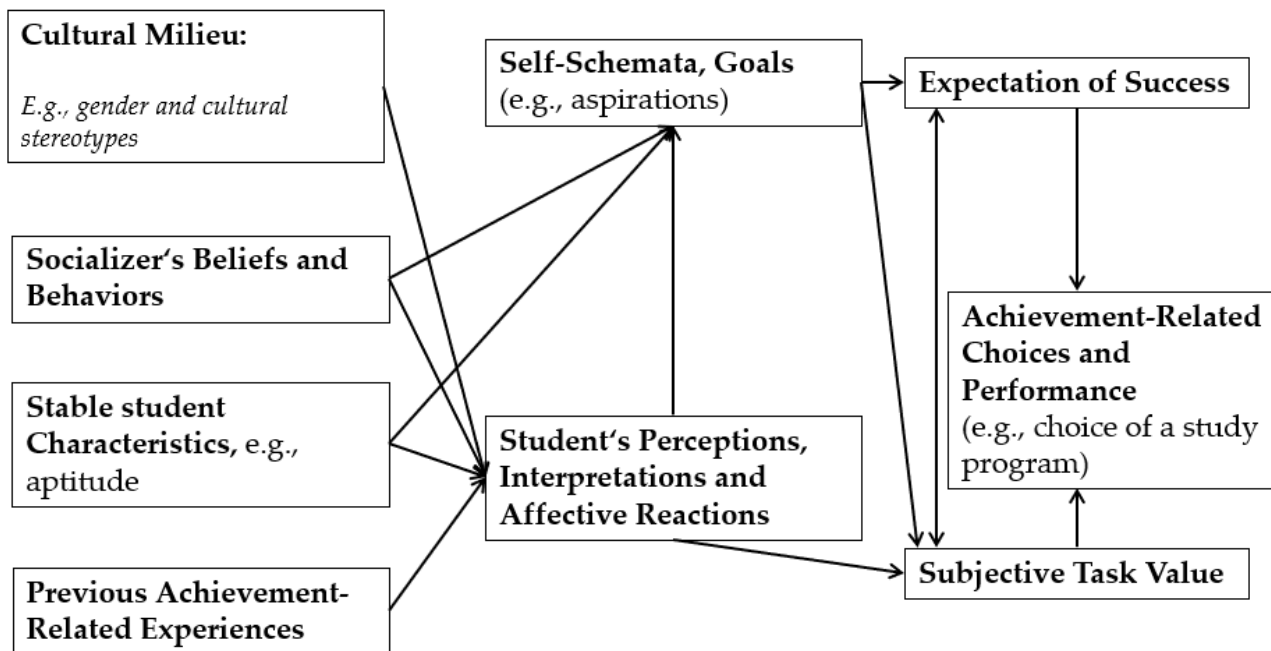


Figure A1. Simplified Expectancy-Value Model following Eccles and Wigfield (2002, p. 119).

Notes

- 1 Whenever “economics” is mentioned in this paper, it also refers to related courses such as business administration, etc.
- 2 A third way is built by upper-secondary specialized schools that are part of the general education system and which lead to a domain-specific qualification for entrance into universities of applied sciences. However, this pathway makes up only a small proportion of about 10% of a cohort.
- 3 The field of study corresponds to the FVB profile. There are five different profiles: (1) Engineering, Architecture, and Life Sciences; (2) Nature, Agriculture, and Food; (3) Business and Services; (4) Design and Art; and (5) Health and Social Care.

References

- Addison, William E., and Jeffrey R. Stowell. 2012. Conducting research on student evaluations of teaching. In *Effective Evaluation of Teaching: A Guide for Faculty and Administrators*. Edited by Mary E. Kite. Washington, DC: Society for the Teaching of Psychology, pp. 1–12.
- Agger, Charlotte, Judith Meece, and Soo-Yong Byun. 2018. The Influences of Family and Place on Rural Adolescents' Educational Aspirations and Post-Secondary Enrollment. *Journal of Youth and Adolescence* 47: 2554–68. [\[CrossRef\]](#) [\[PubMed\]](#)
- Ajzen, Icek. 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50: 179–211. [\[CrossRef\]](#)
- Allgood, Sam, and William B. Walstad. 1999. The Longitudinal Effects of Economic Education on Teachers and Their Students. *The Journal of Economic Education* 30: 99. [\[CrossRef\]](#)
- Angelone, Domenico, and Stéphanie Berger. 2011. *Projekt: Ökonomische Kompetenzen von Maturandinnen und Maturanden: Dokumentation zur Stichprobenbildung [Economic Competencies of High School Graduates: Documentation on Sample Formation]*. Zürich: Dokumentation, Institut für Bildungsevaluation, Universität Zürich.
- Apra, Carmela, Eveline Wuttke, Klaus Breuer, Noi Keng Koh, Peter Davies, Bettina Greimel-Fuhrmann, and Jane S. Lopus, eds. 2016. *International Handbook of Financial Literacy*. Singapore: Springer.
- Asdonk, Jupp, Sebastian Udo Kuhnen, and Philipp Bornkessel, eds. 2013. *Von der Schule zur Hochschule: Analysen, Konzeptionen und Gestaltungsperspektiven des Übergangs*. Münster, New York, München and Berlin: Waxmann.
- Basma, Badriah, and Robert Savage. 2018. Teacher Professional Development and Student Literacy Growth: A Systematic Review and Meta-analysis. *Educational Psychology Review* 30: 457–81. [\[CrossRef\]](#)
- Baumert, Jürgen, and Mareike Kunter. 2006. Stichwort: Professionelle Kompetenz von Lehrkräften. *Zeitschrift für Erziehungswissenschaft* 9: 469–520. [\[CrossRef\]](#)
- Baumert, Jürgen, and Mareike Kunter. 2013. The COACTIV Model of Teachers' Professional Competence. In *Cognitive Activation in the Mathematics Classroom and Professional Competence of Teachers*. Edited by Mareike Kunter, Jürgen Baumert, Werner Blum, Ute Klusmann, Stefan Krauss and Michael Neubrand. Boston: Springer, pp. 25–48.
- Baumert, Jürgen, Mareike Kunter, Martin Brunner, Stefan Krauss, Werner Blum, and Michael Neubrand. 2004. Mathematikunterricht aus Sicht der PISA-Schülerinnen und Schüler und ihrer Lehrkräfte. In *PISA 2003. Der Bildungsstand der Jugendlichen in Deutschland—Ergebnisse des zweiten internationalen Vergleichs*. Edited by Manfred Prenzel, Jürgen Baumert, Werner Blum, Rainer Lehmann, Detlev Leutner, Michael Neubrand, Reinhard Pekrun, Hans-Günter Rolff, Jürgen Rost and Ulrich Schiefele. Münster: Waxmann, pp. 314–54.
- Baumert, Jürgen, Sabine Gruehn, Susanne Heyn, Olaf Köller, Kai-Uwe Schnabel, Ingo Leven, and Frauke Thebis. 1997. *Bildungsverläufe und psychosoziale Entwicklung im Jugendalter (BIJU): Dokumentation—Band 1. Skalen Längsschnitt I, Wellen 1–4. Unpublished paper*.
- Bean, John P. 1982. Conceptual models of student attrition: How theory can help the institutional researcher. *New Directions for Institutional Research* 36: 17–33. [\[CrossRef\]](#)
- Beck, Klaus. 1993. *Dimensionen der ökonomischen Bildung: Messinstrumente und Befunde [Dimensions of Economic Education: Measuring Instruments and Findings]*. Universitärer Abschlussbericht zum DFG-Projekt: Wirtschaftskundlicher Bildungs-Test (WBT). Nürnberg: Universität Erlangen-Nürnberg.
- Becker, Kenneth de, Boukje Compen, Dirk de Bock, and Wouter Schelfhout. 2019. The capabilities of secondary school teachers to provide financial education. *Citizenship, Social and Economics Education* 18: 66–81. [\[CrossRef\]](#)
- Berweger, Belinda, Sebastian Born, and Julia Dietrich. 2022. Expectancy-value appraisals and achievement emotions in an online learning environment: Within- and between-person relationships. *Learning and Instruction* 77: 101546. [\[CrossRef\]](#)
- Bittmann, Felix. 2022. Investigating the role of educational aspirations as central mediators of secondary school track choice in Germany. *Research in Social Stratification and Mobility* 81: 100715. [\[CrossRef\]](#)
- Bothe, T., O. Wilhelm, and Klaus Beck. 2006. *Business Administration Knowledge: Assessment of Declarative Business Administration Knowledge—Measurement Development and Validation*. Berlin: Institut zur Qualitätsentwicklung im Bildungswesen (IQB), Humboldt-Universität zu Berlin.
- Bouley, Franziska, Eveline Wuttke, Kathleen Schnick-Vollmer, Bernhard Schmitz, Stefanie Berger, Sabine Fritsch, and Jürgen Seifried. 2015. Professional Competence of Prospective Teachers in Business and Economics Education: Evaluation of a Competence Model Using Structural Equation Modeling. *Peabody Journal of Education* 90: 491–502. [\[CrossRef\]](#)
- Brick, J. Michael, and Jill M. Montaquila. 2009. Nonresponse and Weighting. In *Handbook of Statistics*. Edited by Danny Pfeffermann and Calyampudi R. Rao. Digital Printing. Amsterdam: Elsevier, pp. 163–85.
- Brückner, Sebastian, Manuel Förster, Olga Zlatkin-Troitschanskaia, and William B. Walstad. 2015. Effects of prior economic education, native language, and gender on economic knowledge of first-year students in higher education. A comparative study between Germany and the USA. *Studies in Higher Education* 40: 437–53. [\[CrossRef\]](#)
- Burić, Irena, and Lisa E. Kim. 2020. Teacher self-efficacy, instructional quality, and student motivational beliefs: An analysis using multilevel structural equation modeling. *Learning and Instruction* 66: 101302. [\[CrossRef\]](#)
- Burroughs, Nathan, Jacqueline Gardner, Youngjun Lee, Siwen Guo, Israel Touitou, Kimberly Jansen, and William Schmidt. 2019. A Review of the Literature on Teacher Effectiveness and Student Outcomes. In *Teaching for Excellence and Equity*. Edited by Nathan Burroughs, Jacqueline Gardner, Youngjun Lee, Siwen Guo, Israel Touitou, Kimberly Jansen and William Schmidt. IEA Research for Education. Cham: Springer International Publishing, vol. 6, pp. 7–17.

- Butters, Roger B., Carlos J. Asarta, and Tammie J. Fischer. 2011. Human Capital in The Classroom: The Role of Teacher Knowledge in Economic Literacy. *The American Economist* 56: 47–57. [CrossRef]
- Chetty, Raj, John Friedman, and Jonah Rockoff. 2013. Measuring the Impacts of Teachers II: Teacher Value-Added and Student Outcomes in Adulthood. *American Economic Review* 104: 2633–79. [CrossRef]
- Clausen, Marten. 2002. *Unterrichtsqualität: Eine Frage der Perspektive? Empirische Analysen zur Übereinstimmung, Konstrukt- und Kriteriumsvalidität*. Pädagogische Psychologie und Entwicklungspsychologie Bd. 29. Münster: Waxmann.
- Compen, Boukje, Kristof de Witte, and Wouter Schelfhout. 2019. The role of teacher professional development in financial literacy education: A systematic literature review. *Educational Research Review* 26: 16–31. [CrossRef]
- Compen, Boukje, Kristof de Witte, and Wouter Schelfhout. 2021. The impact of teacher engagement in an interactive webinar series on the effectiveness of financial literacy education. *British Journal of Educational Technology* 52: 411–25. [CrossRef]
- Day, Stephen H., Christiane Kuhn, and Hannes Saas. 2021. Evaluating and developing teacher instructional practices in economics using a new video-based test. *The Journal of Social Studies Research*, 9. [CrossRef]
- de Clercq, Mikaël, Benoît Galand, and Mariane Frenay. 2017. Transition from high school to university: A person-centered approach to academic achievement. *European Journal of Psychology of Education* 32: 39–59. [CrossRef]
- De Jong, Rob, and Klaas J. Westerhof. 2001. The quality of student ratings of teacher behaviour. *Learning Environments Research* 4: 51–85. [CrossRef]
- Deci, Edward L., and Richard M. Ryan. 1985. *Intrinsic Motivation and Self-Determination in Human Behavior*. Boston: Springer.
- Didion, Lisa, Jessica R. Toste, and Marissa J. Filderman. 2020. Teacher Professional Development and Student Reading Achievement: A Meta-Analytic Review of the Effects. *Journal of Research on Educational Effectiveness* 13: 29–66. [CrossRef]
- Dills, Angela K., and Dennis Placone. 2008. Teacher Attitudes and Teacher Knowledge in Economic Education. *SSRN Journal*. [CrossRef]
- Eberle, Franz, K. Gehrler, B. Jaggi, J. Kottonau, Maren Oepke, and M. Pflüger. 2008. *Evaluation der Maturitätsreform 1995 (EVAMAR): Schlussbericht zur Phase II [Evaluation of the Maturity Reform 1995 (EVAMAR): Final report on Phase II]*. Zürich: Institut für Gymnasial- und Berufspädagogik, Universität Zürich.
- Eberle, Franz, Stephan Schumann, Maren Oepke, C. Müller, N. Barske, M. Pflüger, and S. Hesske. 2009. *Instrumenten- und Skaldokumentation zum Forschungsprojekt "Anwendungs- und problemorientierter Unterricht in gymnasialen Lehr-/Lernumgebungen (APU)"*. Zürich: Dokumentation, Institut für Gymnasial- und Berufspädagogik, Universität Zürich.
- Eberle, Franz. 2015. Die Förderung ökonomischer Kompetenzen zwischen normativem Anspruch und empirischer Rationalität am Beispiel der Schweizer Sekundarstufe II. *Empirische Pädagogik* 29: 10–34.
- Eccles, Jacquelynne S., and Allan Wigfield. 2002. Motivational Beliefs, Values, and Goals. *Annual Review of Psychology* 53: 109–32. [CrossRef] [PubMed]
- Eccles, Jacquelynne S., and Allan Wigfield. 2020. From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemporary Educational Psychology* 61: 101859. [CrossRef]
- Eccles, Jacquelynne S., Terry F. Adler, Susan B. Goff, Judith L. Meece, and Carol Midgley. 1983. Expectancies, Values and Academic Behaviors. In *Achievement and Achievement Motives*. Edited by Janet T. Spence. A Series of Books in Psychology. San Francisco: W.H. Freeman, pp. 75–146.
- Ecclestone, Kathryn, Gert Biesta, and Martin Hughes. 2009. *Change and Becoming through the Lifecourse: Transitions and Learning in Education and Life*. London: Routledge.
- Etzel, Julian M., and Gabriel Nagy. 2015. Students' Perceptions of Person–Environment Fit. *Journal of Career Assessment* 24: 270–88. [CrossRef]
- Faitar, Gheorghita M., and Silviu L. Faitar. 2013. Teachers' Influence on Students' Science Career Choices. *American International Journal of Social Science* 2: 10–16.
- Fend, Helmut, and Werner Specht. 1986. *Erziehungsumwelten: Bericht aus dem Projekt "Entwicklung im Jugendalter"*. Konstanz: Universität Konstanz.
- Ferguson, Ronald F. 2012. Can Student Surveys Measure Teaching Quality? *Phi Delta Kappan* 94: 24–28. [CrossRef]
- Ferguson, Ronald F., and Charlotte Danielson. 2015. How Framework for Teaching and Tripod 7Cs Evidence Distinguish Key Components of Effective Teaching. In *Designing Teacher Evaluation Systems*. Edited by Thomas J. Kane, Kerri A. Kerr and Robert C. Pianta. San Francisco: John Wiley & Sons, Inc., pp. 98–143.
- Finney, Sara J., and Christine DiStefano. 2006. Nonnormal and Categorical Data in Structural Equation Modeling. In *Structural Equation Modeling: A Second Course*. Edited by Gregory R. Hancock and Ralph O. Mueller. Quantitative Methods in Education and the Behavioral Sciences. Charlotte: IAP, pp. 269–314.
- Fraser, Barry J. 1980. Criterion Validity of an Individualized Classroom Environment Questionnaire. Available online: <https://eric.ed.gov/?id=ED214961> (accessed on 14 September 2022).
- Fritsch, Sabine, Stefanie Findeisen, Jürgen Seifried, Franziska Bouley, Eveline Wuttke, Kathleen Schnick-Vollmer, and Bernhard Schmitz. 2015. The impact of university teacher training on prospective teachers' CK and PCK—A comparison between Austria and Germany. *Empirical Research in Vocational Education and Training* 7: 133. [CrossRef]
- Gaertner, Holger. 2014. Effects of student feedback as a method of self-evaluating the quality of teaching. *Studies in Educational Evaluation* 42: 91–99. [CrossRef]
- Ganzeboom, Harry B. G., Paul M. de Graaf, and Donald J. Treiman. 1992. A standard international socio-economic index of occupational status. *Social Science Research* 21: 1–56. [CrossRef]

- Geisler, Sebastian, and Katrin Rolka. 2021. "That Wasn't the Math I Wanted to Do!"—Students' Beliefs During the Transition from School to University Mathematics. *International Journal of Science and Mathematics Education* 19: 599–618. [CrossRef]
- Goe, Laura, Courtney Bell, and Olivia Little. 2008. *Approaches to Evaluating Teacher Effectiveness: A Research Synthesis*. Washington, DC: National Comprehensive Center for Teacher Quality.
- Gonon, Philipp. 2013. Berufsmaturität als Reform: Hybris oder Erfolgsstory? In *Herausforderungen für die Berufsbildung in der Schweiz: Bestandesaufnahme und Perspektiven*. Edited by Markus Maurer and Philipp Gonon. Bern: Hep Verlag, pp. 119–45.
- Haas, Christina, and Andreas Hadjar. 2020. Students' trajectories through higher education: A review of quantitative research. *High Education* 79: 1099–118. [CrossRef]
- Happ, Roland, and Olga Zlatkin-Troitschanskaia. 2021. International Comparative Analyses of Students' Economic Knowledge Using the Test of Economic Literacy. In *Resultate und Probleme der Berufsbildungsforschung: Festschrift für Susanne Weber*. Klaus Beck, Fritz Oser (Hg.). Edited by Klaus Beck and Fritz Oser. Bielefeld: Wbv Media, pp. 43–62.
- Happ, Roland, Olga Zlatkin-Troitschanskaia, and Manuel Förster. 2018. How prior economic education influences beginning university students' knowledge of economics. *Empirical Research in Vocational Education and Training* 10: 99. [CrossRef]
- Heller, Kurt A., and Christoph Perleth. 2000. *Kognitiver Fähigkeitstest für 4.–12. Klassen, Revision (KFT 4–12 + R)* [Cognitive Ability Test for 4–12th Grades, Revision (KFT 4–12 + R)]. Göttingen: Hogrefe.
- Helmke, Andreas. 2017. *Unterrichtsqualität und Lehrerprofessionalität: Diagnose, Evaluation und Verbesserung des Unterrichts*. 7. Auflage. Unterricht Verbessern—Schule Entwickeln. Seelze: Klett Kallmeyer.
- Holtsch, Doreen, Sebastian Brückner, Manuel Förster, and Olga Zlatkin-Troitschanskaia. 2019. Gender gap in Swiss vocational education and training teachers' economics content knowledge and the role of teaching experience. *Citizenship, Social and Economics Education* 18: 218–37. [CrossRef]
- Johnson, Iryna Y., and William B. Muse. 2017. Choice of Academic Major at a Public Research University: The Role of Gender and Self-Efficacy. *Research in Higher Education* 58: 365–94. [CrossRef]
- Jüttler, Michael, and Stephan Schumann. 2019. Is economics a man's business? Exploring the long-term effects of the gender gap in economic competencies at the upper secondary level on students' choice to study economics at university. *Citizenship, Social and Economics Education* 18: 177–97. [CrossRef]
- Jüttler, Michael. 2020. Predicting Economics Student Retention in Higher Education: The Effects of Students' Economic Competencies at the End of Upper Secondary School on Their Intention to Leave Their Studies in Economics. *PLoS ONE* 15: e0228505. [CrossRef]
- Kane, Thomas J., and Douglas O. Staiger. 2012. *Gathering Feedback for Teaching: Combining High-Quality Observations with Student Surveys and Achievement Gains: Research Paper*. MET Project. Seattle: Bill & Melinda Gates Foundation.
- Kane, Thomas J., Kerri A. Kerr, and Robert C. Pianta, eds. 2015. *Designing Teacher Evaluation Systems*. San Francisco: John Wiley & Sons, Inc.
- Keeley, Jared W., Taylor English, Jessica Irons, and Amber M. Henslee. 2013. Investigating Halo and Ceiling Effects in Student Evaluations of Instruction. *Educational and Psychological Measurement* 73: 440–57. [CrossRef]
- Kish, Leslie. 1992. Weighting for Unequal Pi. *Journal of Official Statistics* 8: 183–200.
- Köpfer, Patricia. 2022. Teachers' perspectives on dealing with students' errors. *Frontiers in Education* 7: 868729. [CrossRef]
- Krauss, Stefan, Jürgen Baumert, and Werner Blum. 2008. Secondary mathematics teachers' pedagogical content knowledge and content knowledge: Validation of the COACTIV constructs. *ZDM Mathematics Education* 40: 873–92. [CrossRef]
- Kühling-Thees, C., R. Happ, Olga Zlatkin-Troitschanskaia, and Hans Anand Pant. 2020. The Impact of Entry Preconditions on Student Dropout and Subject Change in Business and Economics. In *Student Learning in German Higher Education*. Edited by Olga Zlatkin-Troitschanskaia, Hans Anand Pant, Miriam Toepper and Corinna Lautenbach. Wiesbaden: Springer, pp. 351–70.
- Kuhn, Christiane. 2014. *Fachdidaktisches Wissen von Lehrkräften im kaufmännisch-verwaltenden Bereich: Modellbasierte Testentwicklung und Validierung*. Empirische Berufsbildungs- und Hochschulforschung Bd. 2. Landau: Verlag Empirische Pädagogik.
- Kuhn, Christiane, Alicia C. Alonzo, and Olga Zlatkin-Troitschanskaia. 2016. Evaluating the pedagogical content knowledge of pre- and in-service teachers of business and economics to ensure quality of classroom practice in vocational education and training. *Empirical Research in Vocational Education and Training* 8. [CrossRef]
- Kunter, Mareike. 2011. *Professionelle Kompetenz von Lehrkräften: Ergebnisse des Forschungsprogramms COACTIV*. Münster: Waxmann.
- Kunter, Mareike, and Jürgen Baumert. 2007. Who is the expert? Construct and criteria validity of student and teacher ratings of instruction. *Learning Environments Research* 9: 231–51. [CrossRef]
- Kunter, Mareike, Jürgen Baumert, Werner Blum, Ute Klusmann, Stefan Krauss, and Michael Neubrand, eds. 2013. *Cognitive Activation in the Mathematics Classroom and Professional Competence of Teachers*. Boston: Springer.
- Lauermann, Fani, Yi-Miau Tsai, and Jacquelynne S. Eccles. 2017. Math-Related Career Aspirations and Choices Within Eccles et al.'s Expectancy-Value Theory of Achievement-Related Behaviors. *Developmental Psychology* 53: 1540–59. [CrossRef] [PubMed]
- Livermore, Tanya, and Mike Major. 2020. Why Study (or Not Study) Economics? A Survey of High School Students. In *Bulletin*. Sydney: Reserve Bank of Australia, pp. 26–36.
- Lüdtke, Oliver, Ulrich Trautwein, Mareike Kunter, and Jürgen Baumert. 2007. Reliability and agreement of student ratings of the classroom environment: A reanalysis of TIMSS data. *Learning Environments Research* 9: 215–30. [CrossRef]
- Maxwell, Nan L., John R. Mergendoller, and Yolanda Bellisimo. 2005. Problem-Based Learning and High School Macroeconomics: A Comparative Study of Instructional Methods. *The Journal of Economic Education* 36: 315–29. [CrossRef]
- Maydeu-Olivares, Alberto. 2017. Maximum Likelihood Estimation of Structural Equation Models for Continuous Data: Standard Errors and Goodness of Fit. *Structural Equation Modeling: A Multidisciplinary Journal* 24: 383–94. [CrossRef]

- Metheny, Jennifer, Ellen Hawley McWhirter, and Maya Elin O'Neil. 2008. Measuring Perceived Teacher Support and Its Influence on Adolescent Career Development. *Journal of Career Assessment* 16: 218–37. [CrossRef]
- Moos, Rudolf H., and Edison Trickett. 1974. *Classroom Environment Scale: Manual*. Palo Alto: Consulting Psychologist Press.
- Muthén, Linda K., and Bengt O. Muthén. 2017. *Mplus User's Guide: Eighth Edition*. Los Angeles: Muthén & Muthén.
- Noack, Peter, Bärbel Kracke, Burkhard Gniewosz, and Julia Dietrich. 2010. Parental and school effects on students' occupational exploration: A longitudinal and multilevel analysis. *Journal of Vocational Behavior* 77: 50–57. [CrossRef]
- Ogbonnaya, Ijeoma Chidinma, Andile Mji, Olivia Neo Mafa-Theledi, and Beatrice Ngulube. 2020. Economics Teachers' Use of Topic Specific Pedagogical Content Knowledge in Teaching Market Dynamics. *Problems of Education in the 21st Century* 78: 371–93. [CrossRef]
- Organisation for Economic Cooperation and Development. 2019. *Education at a Glance 2019: OECD Indicators*. Paris: OECD.
- Organisation for Economic Cooperation and Development. 2020. *Education at a Glance 2020*. Paris: OECD Publishing.
- Praetorius, Anna-Katharina, Gerlinde Lenske, and Andreas Helmke. 2012. Observer ratings of instructional quality: Do they fulfill what they promise? *Learning and Instruction* 22: 387–400. [CrossRef]
- Prenzel, Manfred, Alexandra Kristen, Petra Dengler, Roland Ettl, and Thomas Beer. 1996. Selbstbestimmt motiviertes und interessiertes Lernen in der kaufmännischen Erstausbildung [Self-determined, motivated and interested learning in initial commercial training]. *Zeitschrift für Berufs- und Wirtschaftspädagogik* 13: 108–27.
- Rach, Stefanie, and Aiso Heinze. 2017. The Transition from School to University in Mathematics: Which Influence Do School-Related Variables Have? *International Journal of Science and Mathematics Education* 15: 1343–63. [CrossRef]
- Rasch, Georg. 1980. *Probabilistic Models for Some Intelligence and Attainment Tests*. Chicago: The University of Chicago Press.
- Röhl, Sebastian, and Wolfram Rollett. 2021. Student Perceptions of Teaching Quality: Dimensionality and Halo Effects. In *Student Feedback on Teaching in Schools*. Edited by Wolfram Rollett, Hannah Bijlsma and Sebastian Röhl. Cham: Springer International Publishing, pp. 31–45.
- Rosenzweig, Emily Q., Allan Wigfield, and Jacquelynn S. Eccles. 2022. Beyond utility value interventions: The why, when, and how for next steps in expectancy-value intervention research. *Educational Psychologist* 57: 11–30. [CrossRef]
- Rubin, Donald B. 1987. *Multiple Imputation for Nonresponse in Surveys*. Wiley Series in Probability and Mathematical Statistics. Applied Probability and Statistics 0271-6232. New York: Wiley.
- Ryan, Richard M., and Edward L. Deci. 2000. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist* 55: 68–78. [CrossRef]
- Schlax, Jasmin, Olga Zlatkin-Troitschanskaia, Carla Kühling-Thees, and Sebastian Brückner. 2020. Influences on the Development of Economic Knowledge over the First Academic Year. In *Student Learning in German Higher Education*. Edited by Olga Zlatkin-Troitschanskaia, Hans Anand Pant, Miriam Toepper and Corinna Lautenbach. Wiesbaden: Springer, pp. 371–99.
- Schumann, Stephan, and Franz Eberle. 2014. Ökonomische Kompetenzen von Lernenden am Ende der Sekundarstufe II. *Zeitschrift für Erziehungswissenschaften* 17: 103–26. [CrossRef]
- Seeber, Susan, and Dieter Squarra. 2003. *Lehren und lernen in beruflichen Schulen: Schülerurteile zur Unterrichtsqualität*. Berufliche Bildung im Wandel Bd. 3. Frankfurt am Main and New York: P. Lang.
- Shulman, Lee S. 1986. Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher* 15: 4–14. [CrossRef]
- Shulman, Lee S. 1987. Knowledge and teaching. Foundations of the new reform. *Harvard Educational Review* 57: 1–23. [CrossRef]
- Siegfried, Christin. 2016. The Necessity for Well-Founded Teacher Education in Economics—Findings from Curriculum Analyses. In *Economic Competence and Financial Literacy of Young Adults: Status and Challenges*. Edited by Eveline Wuttke, Jürgen Seifried and Stephan Schumann. Research in Vocational Education Volume 3. Opladen: Verlag Barbara Budrich, pp. 211–32.
- Stocké, Volker. 2007. Explaining Educational Decision and Effects of Families' Social Class Position: An Empirical Test of the Breen-Goldthorpe Model of Educational Attainment. *European Sociological Review* 23: 505–19. [CrossRef]
- Swiss Coordination Centre for Research in Education. 2018a. *PISA 2015: Schülerinnen und Schüler der Schweiz im internationalen Vergleich*. Genf: Konsortium PISA.ch.
- Swiss Coordination Centre for Research in Education. 2018b. *Swiss Education Report 2018*. Aarau: Schweizerische Koordinationsstelle für Bildungsforschung.
- Swiss Federal Statistical Office. 2018. SHIS Catalogue of Branches (UAS + UTE). Available online: <https://www.bfs.admin.ch/bfs/en/home/statistics/education-science/nomenclatures/fkatfh.assetdetail.6127663.html> (accessed on 14 September 2022).
- Swiss Federal Statistical Office. 2019. Catalogue of Branches SHIS (UIT). Available online: <https://www.bfs.admin.ch/bfs/en/home/statistics/education-science/nomenclatures/fkatuni.assetdetail.7166845.html> (accessed on 14 September 2022).
- Tinto, Vincent. 1993. *Leaving College: Rethinking the Causes and Cures of Student Attrition*. Chicago: University of Chicago Press.
- Totenhagen, Casey J., Deborah M. Casper, Kelsey M. Faber, Leslie A. Bosch, Christine Bracamonte Wiggs, and Lynne M. Borden. 2015. Youth Financial Literacy: A Review of Key Considerations and Promising Delivery Methods. *Journal of Family and Economic Issues* 36: 167–91. [CrossRef]
- Upmeier zu Belzen, Annette, and Franke Christen. 2004. Einstellungsausprägungen von Schülern der Sekundarstufe I zu Schule und Biologieunterricht. *Zeitschrift für Didaktik der Naturwissenschaften* 10: 221–32.
- Urban, Carly, Maximilian Schmeiser, J. Michael Collins, and Alexandra Brown. 2020. The effects of high school personal financial education policies on financial behavior. *Economics of Education Review* 78: 101786. [CrossRef]

- van Buuren, Stef, and Karin Groothuis-Oudshoorn. 2011. Mice: Multivariate Imputation by Chained Equations in R. *Journal of Statistical Software* 45: 1–67. Available online: <http://www.jstatsoft.org/v45/i03> (accessed on 14 September 2022). [CrossRef]
- van der Scheer, Emmelien A., Hannah J. E. Bijlsma, and Cees A. W. Glas. 2019. Validity and reliability of student perceptions of teaching quality in primary education. *School Effectiveness and School Improvement* 30: 30–50. [CrossRef]
- van Herpen, Sanne G. A., Marieke Meeuwisse, W. H. Adriaan Hofman, and Sabine E. Severiens. 2020. A head start in higher education: The effect of a transition intervention on interaction, sense of belonging, and academic performance. *Studies in Higher Education* 45: 862–77. [CrossRef]
- Wagner, Wolfgang, Richard Göllner, Andreas Helmke, Ulrich Trautwein, and Oliver Lüdtke. 2013. Construct validity of student perceptions of instructional quality is high, but not perfect: Dimensionality and generalizability of domain-independent assessments. *Learning and Instruction* 28: 1–11. [CrossRef]
- Walstad, William B., and Michael Watts. 2015. Perspectives on Economics in the School Curriculum: Coursework, Content, and Research. *The Journal of Economic Education* 46: 324–39. [CrossRef]
- Walstad, William B., Ken Rebeck, and B. Roger Butters. 2013. The Test of Economic Literacy: Development and Results. *Journal of Economic Education* 44: 298–309. [CrossRef]
- Wang, Ming-Te, and Jessica Degol. 2013. Motivational Pathways to STEM Career Choices: Using Expectancy-Value Perspective to Understand Individual and Gender Differences in STEM Fields. *Developmental Review* 33: 304–40. [CrossRef]
- Wang, Ming-Te, and Jessica L. Degol. 2017. Gender Gap in Science, Technology, Engineering, and Mathematics (STEM): Current Knowledge, Implications for Practice, Policy, and Future Directions. *Educational Psychology Review* 29: 119–40. [CrossRef]
- Wang, Ming-Te, Jacquelynne S. Eccles, and Sarah Kenny. 2013. Not Lack of Ability but More Choice: Individual and Gender Differences in Choice of Careers in Science, Technology, Engineering, and Mathematics. *Psychological Science* 24: 770–75. [CrossRef] [PubMed]
- Wang, Xueli. 2013a. Modeling Entrance into STEM Fields of Study Among Students Beginning at Community Colleges and Four-Year Institutions. *Research in Higher Education* 54: 664–92. [CrossRef]
- Wang, Xueli. 2013b. Why Students Choose STEM Majors. *American Educational Research Journal* 50: 1081–1121. [CrossRef]
- Warm, Thomas A. 1989. Weighted likelihood estimation of ability in item response theory. *Psychometrika* 54: 427–50. [CrossRef]
- Weinert, Franz E. 2001. Concept of Competence: A Conceptual Clarification. In *Defining and Selecting Key Competencies*. Edited by Dominique S. Rychen and Laura H. Salganik. Seattle: Hogrefe & Huber, pp. 45–65.
- West, Stephen G., Aaron B. Taylor, and Wei Wu. 2012. Model Fit and Model Selection in Structural Equation Modeling. In *Handbook of Structural Equation Modeling*. Edited by Rick H. Hoyle. New York: Guilford Press, pp. 209–31.
- Wigfield, Allan, Katherine Muenks, and Jacquelynne S. Eccles. 2021. Achievement Motivation: What We Know and Where We Are Going. *Annual Review of Developmental Psychology* 3: 87–111. [CrossRef]
- Williams, Larry J. 2012. Equivalent Models: Concepts, Problems, Alternatives. In *Handbook of Structural Equation Modeling*. Edited by Rick H. Hoyle. New York: Guilford Press, pp. 247–60.
- Wong, Lawrence P.W., Mantak Yuen, and Gaowei Chen. 2021. Career-related teacher support: A review of roles that teachers play in supporting students' career planning. *Journal of Psychologists and Counsellors in Schools* 31: 130–41. [CrossRef]
- Wu, Margaret L., Raymond J. Adams, Mark R. Wilson, and Samuel A. Haldane. 2007. *ACER ConQuest Version 2.0: Generalised Item Response Modelling Software*. Melbourne: ACER Press.
- Wuttke, Eveline, Jürgen Seifried, and Stephan Schumann, eds. 2016. *Economic Competence and Financial Literacy of Young Adults: Status and Challenges*. Research in Vocational Education Volume 3. Opladen: Verlag Barbara Budrich.
- Zlatkin-Troitschanskaia, Olga, Judith Jitomirski, Roland Happ, Dimitri Molerov, Jasmin Schlax, Carla Kühling-Thees, Manuel Förster, and Sebastian Brückner. 2019. Validating a Test for Measuring Knowledge and Understanding of Economics Among University Students. *Zeitschrift für Pädagogische Psychologie* 33: 119–33. [CrossRef]