

An Investigation the Competence of Preservice Teachers of Economics in the Industrial Revolution Era: A Literature Review

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ABSTRACT

In the 21st Century, advances in information and technology have spurred open access to economic learning for preservice teachers. Reinventing competencies needs to be done to keep pace with the advancement of knowledge and technology in the industrial revolution era. This paper aims to investigate the competence of preservice teachers of economics in the industrial revolution era. The literature review is used to find the challenges faced and the competencies needed by prospective economics teachers. Various relevant and credible literature (Science Direct, Taylor & Francis, Emerald) for two decades have been fast reviewed and comprehensively to show the phases, levels, knowledge, competencies, and cognitive-noncognitive domains. The review findings reveal the challenges that preservice teachers of economics face as a provision for mastering competencies as teachers in the industrial revolution era. Next, a synthesis of the competency reviews is needed for preservice teachers of economics to present relevant and credible studies. Finally, this paper has implications for competencies that need to be prepared or reinvented through actions and policies that lead to professional economics teachers.

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1. INTRODUCTION

Changes in the school environment, learning methods and technology, shifts in learning modes, and information disclosure in learning have implications for teacher competency demands. Teacher competence in the industrial revolution era is a professional teacher who can become a career-long learner to increase the effectiveness of the student learning process in line with the development of the environment. In addition, they must be able to work with colleagues, learn from them, and teach colleagues to deal with the complexities of school and teaching challenges. Teachers carry out professional teaching activities to ensure the quality of learning and have direct communication, and use technology effectively by involving learning stakeholders (students, parents, academic staff).

Professional teachers are created from the learning process on campus full of challenges and demands for skills. As a preservice teacher in the field of economics must fundamentally master the content and pedagogical aspects. Economic content includes mastery of introductory, micro, macro, statistics, econometrics, and other supporting lecture materials. In contrast, pedagogy consists of teaching and learning economics materials, such as educational professions, teaching and learning strategies, evaluation, micro-teaching, and other pedagogical materials. Therefore, mastery of knowledge of economic and pedagogical content is a fundamental competence for economics teacher students.

We are beginning to explore the literature related to content, pedagogic, and technological knowledge as the initial foundation for investigating the competencies prepared by the preservice teacher in the field of economics in the era of the industrial revolution. Allgood and Bayer (2016) explain four essential concepts of micro and macroeconomic content, namely 1) individual decision making, 2) markets and other interactions, 3) aggregate economy, 4) the role of government and institutions. The essential concept of economics is related to the fundamental competencies possessed by students. Next, they describe the essential competencies, among others: 1) competence to apply scientific processes to economic phenomena, 2) competency analysis and evaluation of behavior and outcomes using economic concepts and models, 3) using a quantitative approach in economics, 4) critical thinking competence about economic methods and their application, and 5) the competence to convey economic ideas in various scientific collaborations. The content and the essential economic competencies are *content knowledge* (CK) that need to be combined with the pedagogical dimensions of the preservice teacher of economics into *pedagogical content knowledge* (PCK).

Pedagogical knowledge is an element of teaching and learning knowledge inherent in teaching students. Bosshardt (2020) explains that nine challenges in learning can be designed as new ideas in economics learning. The challenges consist of 1) students' mental mindset, 2) metacognition and self-regulation, 3) students' fear and distrust, 4) prior knowledge, 5) misconceptions, 6) ineffective learning strategies, 7) transfer of learning, 8) focus on constraints selectively, and 9) mental effort and working memory constraints. Teachers and prospective teachers can make these challenges into the potential to increase their pedagogical knowledge. Their pedagogical skills will be tested through these challenges. The learning of pedagogical knowledge and skills can utilize various resources (e.g., online models) that are innovative and effective in developing teaching and learning practices (Maier et al., 2012).

The latest combination includes technology components in PCK so that it becomes *technological-pedagogical content knowledge* (TPACK) as a framework for the reconstruction of skills needed in the industrial revolution era. Various works of literature (Moryl, 2014; Moryl & Jiang, 2013; Swan & Hofer, 2011) show the efforts made by teachers in various ways to utilize economics learning media using podcasts (see <https://audioecon.com/>). Research findings show technological solid pedagogical knowledge (TPK). However, technological content knowledge (TCK) in designing and implementing podcasting projects has not been maximized (Moryl, 2014). This provides information that the use of technology in general for pedagogical knowledge is quite optimal. However, if you use a variety of technology in learning, it still needs to be optimized.

It takes redesign and makes a shift from content orientation to competency-based design. They were learning in higher education, emphasizing critical thinking, inquiry, reasoning, and communication skills. Economics teacher students who have a strong understanding of economics will have the skills to explain the dynamic economic events that occur around them as they are and the ability to make predictions about economic conditions that will occur in the future (Allgood & Bayer, 2016). A student with an economics education will have the ability to apply these skills in developing insights and formulating solutions in their work, and personal becoming a professional economics teacher.

Competencies in the industrial revolution era are also known as 21st century competencies. In the 21st century, various technological developments, education, and health experienced a surge that positively impacted human welfare. The author uses the terminology of the industrial revolution 4.0,

which is more specific to education, to investigate the main competencies possessed by teacher students in the 21st century. At this time, the acceleration of information technology has multi-effects on various sciences, including education. Partnership for 21st Century Learning or P21 (2019) explains that economics is one of the main topics in 21st century learning. Various literacy competencies are prepared for learning that led to the 4.0 industrial revolution, such as financial literacy, economics, and entrepreneurship. In addition to literacy in economic subjects, the learning and innovation skills that students must possess are critical thinking, communication, collaboration, creativity, known as 4Cs (Partnership for 21st Century Learning, 2019).

Moving on from the learning skills of the industrial revolution era, teachers need reactive adaptation to the development of information and technology in the industrial revolution era. Many studies have discussed competence in the industrial revolution era from various perspectives and skill domains (Becker, 2000; Burnett et al., 2014; Clouse & Alexander, 1997; Dewi et al., 2020; Partnership for 21st Century Learning, 2019; Pilgrim & Martinez, 2013; Voogt & Roblin, 2010). Literacy skills are the main skills that are majorly trending topics related to teacher competence in the industrial revolution era. Some scholars have framed these literacy skills into the Charter for Literacy Education (Burnett et al., 2014), which reviews literacy education to address the specific challenges of curriculum integration and technological developments (Burnett & Merchant, 2015). In the results and discussion sections, the literacy skills needed by prospective economic teachers have been discussed in the industrial revolution era.

This paper aims to investigate the competence of preservice teachers of economics in the industrial revolution era. First, the author reviews preservice teacher's competencies based on the challenges and struggles of teaching economics from various credible sources over two decades. This perspective is used to dig deeper into current issues related to the economic learning process in the industrial revolution era, replanting more implicative teacher competencies that economic teacher students should have to grow into professional economics teachers in the current era.

2. METHODS

This literature review identifies the competence of the preservice teachers of economics in the industrial revolution era (amount thirty articles). The literature review will synthesize various competencies required by preservice teachers of economics at phases, levels, knowledge, and cognitive domains.

This paper uses a fast review method to review relevant and credible literature sources over the past two decades, can analyze evidence, and minimize errors to produce reliable findings into conclusions and recommendations for new insights (Davis et al., 2014; Moher et al., 2009; Snyder, 2019). The process of conducting a literature review goes through four stages: 1) designing a review, 2) conducting a review, 3) analyzing it, and 4) writing a synthesis (Davis et al., 2014; Snyder, 2019). The stage of designing a review by determining the main topic that will be studied in depth. The competence of preservice teachers of economics is the topic of this paper. The literature collection stage is to search and collect literature from credible and reputable journals. The authors used major and credible publishers, concluding thirty articles on the main topics collected from Science Direct, Taylor & Francis, and Emerald over the last two decades. The next stage is to analyze the literature that has been collected. The last stage is to write a synthesis of the literature that has been reviewed. The synthesis and findings related to the competence of preservice teachers of economics will be explained comprehensively in the next section.

3. FINDINGS AND DISCUSSION

The initial review process is carried out by designing a literature review related to the preservice teachers' competence in economics. The author collects various literature quickly and accurately from various relevant and credible journals. The review of the competence of economics teacher students

sees challenges as an essential source of information that will gradually map out the competencies needed to face these challenges. Quick overview summaries from various sources are briefly presented in Table 1.

Table 1. Overview of the Challenges of the Preservice Teachers of Economics as Competencies

Sources	Challenges	Competencies
Bosshardt (2020)	Economics educators can learn from nine pedagogical challenges in learning.	Potential dimensions in understanding the effectiveness of pedagogical techniques to address nine challenges in learning.
Jeschke et al., (2019)	Instructional quality includes the ability of teachers to react immediately in classroom situations that represent authentically real-life teaching practices.	Action-based skills related to content knowledge and pedagogical content knowledge.
Aspelin & Jonsson (2019)	Relationships between teachers and students that support learning.	Relational competence consists of communicative, differentiation, and socio-emotional competence.
Tondeur et al., (2018)	Ability to integrate ICT characteristics and profiles with various strategies for the preservice teachers' experiences.	ICT competence
Kuhn et al., (2018)	The instructor (preservice teacher) responds to the interaction between teachers and authentic students in economics learning.	ICT utilization competence
Larson & Brown (2017)	Preparing students who have global abilities	Language and literacy, technological competence, and civic competence
Kuhn et al., (2016)	Evaluation of content pedagogical knowledge assessment during pre-and in-service business and economics teachers	Video-based assessment competence
Allgood & Bayer (2016)	Explain the dynamics of economic events and make predictions about economic conditions that will happen in the future.	1) competence to apply scientific processes to economic phenomena, 2) competency analysis and evaluation of behavior and outcomes using economic concepts and models, 3) using a quantitative approach in economics, 4) critical thinking competence about economic methods and their application, and 5) the competence to convey economic ideas in various scientific collaborations.
Bouley et al., (2015)	Professional competence of teachers from cognitive and non-cognitive aspects is needed for teaching quality and student achievement.	Professional competence consists of content knowledge and pedagogical knowledge.
Burnett & Merchant (2015)	Challenges of curriculum integration and technological developments.	Digital competence.

Sturmer et al., (2013)	The teacher's professional vision includes the ability to apply pedagogical knowledge and practical learning.	Professional competence has an impact on the learning process..
Maier et al., (2012)	Pedagogic resources of innovative, effective, and accessible teaching practices.	Pedagogic competence
Swan & Hofer (2011)	Integrate podcasting to help their students build economic literacy, which includes building economic concepts and skills.	ICT utilization competence.
Adu et al., (2009)	Concerns about poor economic performance are caused by low numeric ability.	Numerical ability.
Becker & Watts (2001)	The use of conventional media in academics to determine how principles, intermediate theory, statistics, and econometrics are taught.	Numerical ability is needed as a requirement to follow the material.
Becker (2000)	Teaching economics in the 21st Century aims to produce students to think like economics.	Pedagogical competence involves students' active ideas on learning and using the internet. Assessment and feedback skills are also required.

During the last two decades, the development of information and technology has proliferated. All information is freely available, and students can explore information that they have not received in class (Clouse & Alexander, 1997), so reinventing teacher competencies has become the concern of several previous scholars who presented various competencies needed in the industrial revolution era. This paper investigates explicitly, discovers, and completes the competencies that preservice teachers need to prepare to become professional teachers in the industrial revolution era.

In the next stage, after obtaining a summary of the information on challenges and competencies, a competency analysis that supports and relates to each other is carried out to shape the competence of the preservice teachers of economics students in the industrial revolution era.

Several findings and studies from previous researchers related to the competence of the preservice teachers of economics in the industrial revolution era led to several competencies needed in the 21st century, such as critical thinking, communication, collaboration, creativity (Partnership for 21st Century Learning, 2019), ICT literacy, social and cultural competencies (Voogt & Roblin, 2010), digital literacy (Burnett & Merchant, 2015; Pilgrim & Martinez, 2013), information, ethics, and social impact (Ananiadou & Claro, 2009). Although several competencies in the 21st century have been described, these competencies are not yet specific to the needs of teachers in the economics domain. Thus, this paper has found, analyzed, and synthesized competencies (see Table 2) from various credible studies that examine the competencies of prospective teachers or economics teachers. These competencies are analyzed in-depth for their relevance in the industrial revolution era.

The Competence of Preservice Teachers of Economics in the Industrial Revolution Era

Literacy competence in the industrial revolution era is the ability of students to use technology to track, identify, collect, analyze, interpret, and communicate information (Association, 1989; Pilgrim & Martinez, 2013). Literacy competence emphasizes the depth of information needed, the ability to find information effectively and efficiently, combining information with existing knowledge, and understanding the educational and economic information environment. The literacy skills of preservice teachers are closely related to optimizing information and technology to become professional teachers. Learning outcomes that produce students who are successful in global competitiveness, teachers are prepared in the context of economic learning who have the knowledge, language and cross-cultural

skills, pedagogical skills, a solid commitment to ethics and responsibility, and dispositions related to global competence (Larson & Brown, 2017; Partnership for 21st Century Learning, 2019).

The preservice teachers of economics face learning materials close to mathematical calculations (Jeschke et al., 2019), such as micro, macro, and econometrics. As a prospective economics teacher, numerical competence is essential to understanding and interpreting economic data in everyday life. With good statistical skills, they can explore secondary socio-economic data helpful in understanding economic content (Carter et al., 2011). In addition, students' quantitative abilities contribute to economic learning achievement (Adu et al., 2009). *Numerical competence* is closely related to literacy competence (Méndez-Carbajo, 2016); some researchers refer to it as statistical literacy ability (Carter et al., 2011). However, these two competencies have different limitations, which lie in counting, which demands higher-order thinking. Computing skills are so relevant to support the competence of the preservice teacher of economics to manipulate and interpret data-based economic phenomena that are currently needed in the industrial revolution era.

Professional competence is between the prime and excellent phases (see Table 2), a bridge for preservice teachers of economics to have powerful competencies as professional economics teachers. These competencies are majorly stated by experts consisting of content knowledge and pedagogical knowledge. The content aspect explores students' abilities to understand various introductory, micro, and macroeconomic materials well. In general, economic content is close to mathematics (Jeschke et al., 2019), so numerical ability is an essential competency and a prerequisite for understanding economic content comprehensively.

Furthermore, Bouley et al. (2015) explain that the professional competence of economics and business teachers consists of the dimensions of professional knowledge (content knowledge and knowledge of pedagogical content) and non-cognitive dimensions (trust, self-efficacy, and self-regulation). On the aspect of trust reviewing the transmissive view of economic and business learning. The aspect of self-regulation consists of students' ability to set goals, planning, motivation, willingness, self-monitoring, and reflection. Finally, in the aspect of self-efficacy, the attitude of students' self-ability to master economic and pedagogical content well.

Competence in conducting *assessments and feedback* is one of the significant and relevant competencies for prospective economics teachers found in various literature (Becker, 2000; Kuhn et al., 2016). The preservice teacher should monitor the progress and achievements of the learning process that occurs. Assessment and feedback are instruments that are proven to be effective in measuring economic learning outcomes. Majorly, assessment using multiple-choice instruments measures learning for practical and efficient reasons, but it is not an assessment instrument that concretely describes students' abilities. There needs to be a variety of assessment instruments tailored to the aspects of student mastery to be assessed. Aspects of mastery of students' attitudes can use the instruments of observation, self-assessment, and peer assessment. Aspects of mastery of knowledge students can use the instruments of written tests, oral tests, assignments, and portfolios. Aspects of mastery of skills, students can use performance instruments, projects, and portfolios. In addition to these competencies, providing feedback is also a competency that complements the learning process achievements. Student responses are expected for progress and evaluation of learning. Openness and acceptance are the primary keys of feedback competence to reconstruct future learning improvements.

Competence in using ICT is an integral part of updating classroom teaching. As a prospective economics teacher, you should present data through attractive and stunning graphic information. Various graphic forms will stimulate students to understand micro and macroeconomics more easily. In addition, the shift towards technology-based learning also makes it easier for students to learn anywhere and learn from anyone. Teachers deliver content early through e-learning in the form of text, podcasts (Moryl, 2014; Moryl & Jiang, 2013), and videos (Kuhn et al., 2018) which can be accessed freely by students so that students have an initial understanding and can browse the material—related to early learning. This method is known as blended learning. The ability to explore ICT will result in a

new learning style. The shift in the delivery of conventional material to become more diverse with podcasts and videos has become a favorite and practical learning style for millennial students.

The use of technology in learning is a teaching skill that adapts to the industrial revolution era marked by the optimization of technology in life. Economics learning demands various multitasking skills to master, explain, communicate, and generate new ideas from the current polemic of economic learning. Multitasking skills are manifested in the form of relational skills. We are places *relational* skills at a powerful level. This is due to the massive implementation and actualization of professional teachers. They will collaborate and explore the available resources through controlled communication, socio-emotional skills, and differentiation of mastery of economic learning.

Table 2. Competency Synthesis of the Preservice Teachers of Economics

Phase	Prime		Excelent			
Level	Esensial		Intermediate		Powerful	
Knowledge	Content		Pedagogical		Technological	
Competence	Literacy	Numeric	Profession al	Assessme nt and Feedback	ICT Utilization	Relational
Cognitive	Introduction, micro, macroeconomics		Content and pedagogy	Test, multiple choice, authentic learning	Internet usage, videos, podcasts	Engaging ideas in learning
Non- cognitive	Digital literacy, informatio n literacy, Web literacy,	Interpretatio n, prediction, critical thinking	Trust, self- efficacy, and self- regulation	Student activity portfolio, self- assessmen t, peer- assessmen t.	Technolog y acceptance attitude	Communicativ e, differentiation, and socio- emotional
References	(Partnershi p for 21st Century Learning, 2019; Pilgrim & Martinez, 2013)	(Adu et al., 2009; Becker & Watts, 2001; Carter et al., 2011; Méndez- Carbajo, 2016; Partnership for 21st Century Learning, 2019)	(Bosshardt, 2020; Bouley et al., 2015; Jeschke et al., 2019; Maier et al., 2012; Stürmer et al., 2013)	(Becker, 2000; Kuhn et al., 2016)	(Becker, 2000; Kuhn et al., 2018; Moryl & Jiang, 2013; Swan & Hofer, 2011; Tondeur et al., 2018)	(Aspelin & Jonsson, 2019; Becker, 2000)

This paper synthesizes the competence of the preservice teachers of economics in two phases. The division of these phases is intended to map out essential competencies and competencies as excellent teacher candidates. Essential competence describes the competencies inherent in their knowledge of economics teachers in general, where they hold a bachelor's degree in economics concentration education. However, not all economic education graduates have such concentration. Some actively participate in training, internships, and certification programs to complete their competencies into

superior competencies that can collaborate to become professional teachers. Therefore, the grouping of competency phases referred to in this paper is described accurately.

First, *the prime phase* is the process of extracting economic and pedagogic content optimally. In this phase, essential competencies are needed as prerequisites for mastering content knowledge and pedagogical knowledge. Literacy competencies (Partnership for 21st Century Learning, 2019; Pilgrim & Martinez, 2013), numerical (Becker & Watts, 2001; Johannssen et al., 2021), and professional (Bouley et al., 2015; Jeschke et al., 2019; Stürmer et al., 2013) found majorly from various literature that displays these competencies to be mastered by preservice teachers. Various literature reviews have found the dominant challenges and problems that occur in this phase. In general, many preservice teachers of economics are in this phase with the essential and highest levels of achievement at the intermediate level. In this phase, the elements of ICT utilization and correlational competencies have not been maximally mastered and implemented by students, so extra efforts are needed to have these two competencies.

Furthermore, *the excellent phase* is the competence of the preservice teachers who describes the analysis, findings, find ideas, and communicates the latest issues related to the economy, which are implemented in classroom learning. Competence assessment and feedback (Becker, 2000; Kuhn et al., 2016), ICT utilization (Becker, 2000; Clouse & Alexander, 1997; Kuhn et al., 2018; Tondeur et al., 2018), and relational (Aspelin & Jonsson, 2019; Becker, 2000) were found from various major studies discussing the competencies of prospective preservice teacher of economics. This phase is the same as the right side of the standard curve. Unfortunately, few preservice teachers of economics mastered competencies at a powerful level and became professional economics teachers in the industrial revolution era.

4. CONCLUSION

A comprehensive and in-depth investigation has been described with various phases, levels, knowledge, competencies, and cognitive and non-cognitive domains related to the competence of the preservice teacher of economics in the industrial revolution era. The competencies that have been described provide updates and complements previous research so that they can become a reference for the economics, academic community, economists, and future researchers to implement actions and policies for developing economic learning in the industrial revolution era. This paper has presented specific investigative information related to essential and superior competencies for the preservice teachers of economics and knows where to originate efforts to reinvent economics teacher competencies. This paper still lacks in exploring competencies related to roles that support mastering these competencies, such as students' initial potential, learning tools, environment, and policies that can be reviewed and researched further. Suggestions for scholars to conduct future research exploring the lecturer's strategies in learning to master the competence of preservice teachers of economics are found in this paper.

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