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Systematic Review of Learning Generic Skills in Higher Education—Enhancing and Impeding Factors

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The research field on generic skills in higher education has expanded rapidly. In addition, the importance of generic skills has been highlighted both in educational policy discourses and in practice of higher education. The present study reviews theoretical, methodological, and empirical viewpoints on learning generic skills and synthesizes the empirical evidence about the factors that enhance and impede student learning of generic skills. Altogether 116 articles were included in the analysis. The systematic analysis revealed remarkable variation in concepts, research methods, and operationalization of generic skills. These findings suggest that research in this field is still incoherent. According to the results, contextual factors that enhance or impede higher education students' learning of generic skills were investigated more often than individual factors. Furthermore, the articles included in this review emphasized learning of work-oriented professional skills over higher-order thinking skills. To ensure the development of research on generic skills, it is important to focus on more coherent theorization and operationalization of the various generic skills. More longitudinal studies with methods that genuinely capture actual skills and their development are also needed to advance the field. The results can be used for future discussions on theorization, empirical research, and practical development of student learning of generic skills.

Keywords: generic skills, learning, higher education, systematic (literature) review, enhancing and impeding factors

INTRODUCTION

Generic skills, such as critical thinking, collaboration, communication, argumentation, and problem-solving skills, usually refer to cognitive skills and higher order thinking skills, as well as twenty-first century competence and future citizens' literacy. Learning generic skills is widely singled out as the key aim of higher education in addition to domain-specific knowledge and skills (e.g., Arum and Roksa, 2011; Hyytinen et al., 2019; Shavelson et al., 2019). The importance of generic skills has been also highlighted in the transition phase to work and later in working life (Tuononen et al., 2019). Similarly, generic skills are considered essential for citizens of the twenty-first century in various policy papers and reports (Strijbos et al., 2015; OECD, 2019). As part of a discussion on educational policy, several lists of the key generic skills of higher education have been compiled (European Parliament Council, 2008; OECD, 2019). For example, the European Parliament Council (2008) has determined the key generic skills that should be included in higher

education degrees. Consequently, generic skills are found as learning objectives in almost all higher education curricula today. Naturally, the aim is to organize teaching so as to enhance student learning in the best possible way. Therefore, it is not surprising that higher education students' generic skills have also attracted remarkable interest from researchers, and become an expanding field of research.

Unfortunately, this broad interest in generic skills and proliferation of studies involves some disadvantages. The interests, intentions, and perspectives of various stakeholders have influenced the research on generic skills and especially the development of research instruments (Strijbos et al., 2015; Muukkonen et al., 2019; Toom et al., 2021). Thus, the research field is at risk of fragmentation. Recent evidence suggests that there is conceptual incoherence in the research field of generic skills as well as a lack of clear theoretical frameworks and robust instruments (e.g., Barrie, 2006; Braun et al., 2012; El Soufi and See, 2019). Another disadvantage is related to research designs and methods. It seems that previous research has relied mainly on indirect methods and materials, such as self-reports of learning, in the investigations of generic skills, and only a limited number of studies have applied performance-based methods and focused on learning generic skills in authentic situations (Braun et al., 2012; Zlatkin-Troitschanskaia et al., 2015). In addition to the scattered research on student learning of generic skills, systematic research on the characteristics of the learning environment or other factors contributing to student learning of generic skills is scarce. This may be related to the laborious research designs that the studies would require, or the lack of robust and valid research instruments to measure generic skills and characteristics of the learning environment. In order to obtain a more coherent picture of the status of generic skills research, there is a need for the systematic analysis of the methods and concepts utilized in the studies.

Through a systematic review, this study aims to contribute to existing theoretical, methodological, and empirical viewpoints on learning of generic skills. This study reviews and synthesizes the empirical evidence about higher education students' generic skills and the factors that enhance and impede their learning of generic skills. Moreover, this study explores methods that are used in the empirical studies and elaborates on concepts related to learning generic skills. The research questions are as follows:

- 1) From the perspective of student learning in higher education, which generic skills are explored in empirical research, and how are they explored?
- 2) How do higher education students learn generic skills during their studies?
- 3) Which factors have been identified to enhance or impede student learning of generic skills?

MATERIALS AND METHODS

A combined literature search in the electronic databases of EBSCOHost, Scopus, and Eric was carried out to identify peer-reviewed journal articles in English. The three main keywords utilized in the search were “student learning,” “generic skills,” and “higher education,” but the searching of databases included

the combination of words and phrases such as learning or “student learning” and “generic skills” and “higher education” or “university.” The search included all disciplines. We searched online and empirical research articles from 2014 to 2019, resulting in over 907 articles. After that, the first and second authors went through the titles and abstracts, and selected those studies that specifically addressed higher education student learning of generic skills. Therefore, the articles focusing solely on teachers' or employers' perspectives on learning generic skills were excluded. In addition, educational policy articles related to generic skills, quality assurance, curriculum analysis, theoretical, and review articles were excluded. Finally, 393 articles were selected for the first phase of review. During this phase, the first and second author read the articles and ensured that the articles met the inclusion criteria. The following inclusion criteria were used: (1) the study was retrieved from a peer-reviewed journal, (2) it was written in English, (3) the study was conducted in the context of higher education, and (4) the study reported empirical evidence on students' learning of generic skills. In addition, duplicates were removed in this phase. After that, a total of 273 articles were included in the analysis. In the second phase of review, the first and sixth author went through the articles and re-checked that they met the criteria. Especially the fourth criterion was at the focus in this phase of article selection. After these thorough reading rounds, 116 articles were finally included in the analysis. In the **Figure 1**, flow selection process is presented.

Analysis

Qualitative content analysis was adopted for the analysis of the articles (Elo and Kyngäs, 2007). First, all articles were read through to gain familiarity with the data and to identify the concepts that were utilized in the studies focusing on the higher education students' learning of generic skills. Each article was analyzed separately and systematically. We found extensive conceptual variation. The articles were categorized based on the concepts utilized in the articles. We identified two types of articles based on the focus of the articles (see **Table 1**). The first type of article focused on sets of generic skills while the others concentrated on specific generic skills. In total, analysis revealed six different specific generic skills. Below, we consider these two types of articles in greater detail.

In the second phase of analysis, the first author further analyzed which generic skills were measured in the first type of article, namely those that focused on sets of generic skills. The measured skills were categorized into 17 main categories based on the analysis. These categories (see **Table 2**) were subsequently reviewed and refined through discussion between all authors. In the third phase, the articles of both types were further analyzed in terms of the research methods used in the studies. In addition, during this phase, learning of generic skills as well as enhancing and impeding factors in learning generic skills were identified from the results sections of the articles. Descriptions of the qualities analyzed were written for each article and collected in Excel worksheets. The fourth and final phase consisted of final interpretations discussed by all the authors. All authors participated in all the phases of analysis, except the second phase which was conducted by the first author.

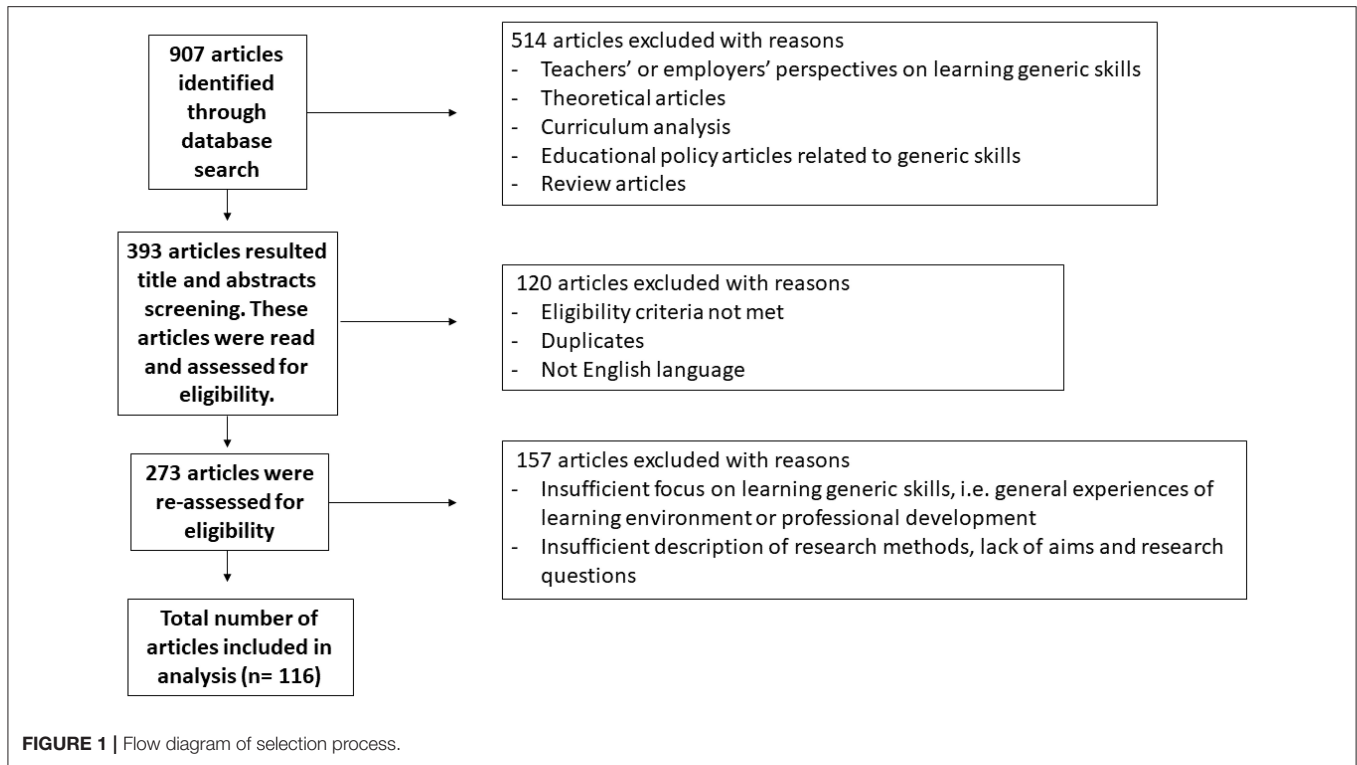


TABLE 1 | Phases of analysis.

Phase of analysis		116 generic skills articles	
Familiarizing oneself with the data			
First phase	Set of generic skills articles (n = 70)	Specific generic skills articles (n = 46)	<ul style="list-style-type: none"> - Critical thinking skills - Communication skills - Collaboration skills - Creativity and problem-solving skills - Self-regulation skills - Ethical skills
Second phase	Operationalization of measured skills → 17 categories		
Third phase	Research methods, learning of generic skills, enhancing and impeding factors	Research methods, learning of generic skills, enhancing and impeding factors	

RESULTS

Measured Skills and Methods in the Reviewed Articles

Our first aim was to explore, from the perspective of student learning in higher education, which generic skills are explored in empirical research, and how they are explored. The final sample included studies that had various objectives, and that were

conducted using a wide variety of research methods. There was great variation in the number of the participants in the studies reviewed, from six students to 74,687 students. As mentioned above, there was remarkable variation in the generic skills investigated in the articles (see **Table 1**). There were two types of articles, namely, those focusing on a set of generic skills and those focusing on a specific generic skill at a time. Most of the articles (60%, n = 70) focused broadly on sets of generic skills. These studies described their focus as generic skills, or a similar concept, such as employability skills, transferable skills, soft skills, graduate attributes, generic competencies, learning outcomes, academic competencies, core competencies, and non-technical skills. In addition, the rest of the studies framed their research with generic skills but focused on more specific generic skills (n = 46), namely critical thinking skills, communication skills, collaboration skills, creativity and problem-solving skills, self-regulation skills, or ethical skills. Due to the difference in the approach the studies adopted, in the following section we report separately the studies that focused on *sets of skills* and the studies that focused on a *specific generic skill*. Hence, section Sets of Generic Skills reveals the variation identified in studies focusing on a set of generic skills and, respectively, section Specific Generic Skills concentrates on articles that focus on specific generic skills by describing the identified skills and the methods used to investigate these skills.

Sets of Generic Skills

In the articles that focused broadly on sets of generic skills, the definitions of generic skills and the methods that were used to measure those skills were varied. Based on the information

TABLE 2 | Sets of generic skills: the main categories and subcategories of measured generic skills.

Main category of generic skills (f)	Subcategories (f)
Professional skills (93)	Professionalism (32), leadership (24), managerial (16), entrepreneurial skills (11), information management (6), project skills (4)
Analytical skills (66)	Critical thinking (23), analytical thinking (20), creative thinking/innovation (18), systems thinking (5)
Applying knowledge (59)	Problem-solving (34), decision making (16), applying theory to practice (9)
Communication skills (59)	Communication (43), writing skills (16)
Collaboration skills (51)	Collaboration skills, teamwork (51)
Time-management skills (29)	Time-management, planning (29)
Study skills (29)	Lifelong learning (10), information searching (8), study skills (5), ability to understand theories (4), knowledge building (2)
Self-knowledge (25)	Self-knowledge including confidence, self-regulation skills, ability to manage emotions and stress, reflection; knowing what study methods are suitable for me; sense of worth and world view; self-criticism (25)
Information technology skills (23)	ICT, computer skills and social media skills (23)
Ethics and responsibility (18)	Research ethics including work ethics, professional moral quality, social responsibility, treat customers data confidentially (18)
Globalization (17)	Globalization, community and citizenship (13), multidisciplinary (4)
Research skills (15)	Research skills, analyze and use numbers and data accurately (15)
Adaptability (10)	Adaptability including adapting to new situations; ability to understand and adapt environment, ability to make changes, flexibility (10)
Personal attributes (10)	Dedication, right personality, perseverance, frankness, open-mindedness, curiosity, resilience, persistence (10)
Foreign language skills (10)	Foreign language (10)
Career skills (5)	Career skills including career planning CV; job applications, interviews, grant applications (5)
Feedback (2)	Utilizing and providing feedback (2)

available about the surveys used, we analyzed which skills were measured as a part of the sets of generic skills (see **Table 2**). The number of skills measured varied from three to 89. These skills were categorized into 17 main categories. The skills most often measured were professional skills ($f = 93$), including professionalism, leadership, project skills, and entrepreneurial skills. Next, analytical skills ($f = 66$), applying knowledge ($f = 59$), communication skills ($f = 59$), and collaboration skills ($f = 51$). After these, time-management ($f = 29$), study skills ($f = 29$), self-knowledge ($f = 25$), and ICT skills ($f = 23$) were included in the instruments. Ethics ($n = 18$), globalization ($f = 17$), research skills ($f = 15$), adaptability ($f = 10$), foreign language skills ($f = 10$), and personal attributes ($f = 10$) were also measured in numerous studies. Additionally, career skills (f

$= 5$) and giving and receiving feedback ($f = 2$) were measured in a few studies. However, it is important to note that not all articles reported the survey instrument used at all, or the instrument was not reported accurately. In **Table 2**, categories and subcategories of the measured generic skills are presented in greater detail.

Most of the these studies that measured sets of generic skills utilized surveys (e.g., Jackson, 2014a, 2015; Pita et al., 2015; Prokofieva et al., 2015; Abayadeera and Watty, 2016; Joseph et al., 2016; Monteiro et al., 2016; He et al., 2017; Burch et al., 2018; Akhmetshin et al., 2019; López et al., 2019). Control and experimental groups were also used in study designs (Guo, 2019; Tomasson Goodwill et al., 2019). In addition, five articles used qualitative methods (Viviers, 2016; Kridiotis and Swart, 2017; Sonnenschein et al., 2017; Nastiti et al., 2018; Lee et al., 2019), and mixed methods (Bellew and Gabaudan, 2017; Dinning, 2017; Sarkar et al., 2017; Ssegawa and Kasule, 2017; Tran, 2017; Tomasson Goodwill et al., 2019), and one was a mixed-method study using performance-based assessment and interviews (Feldon et al., 2016). In these articles various generic skills were measured using scales including several items or one-item measures (Yin et al., 2014, 2016; Abayadeera and Watty, 2016; Jackson, 2016a; Liu et al., 2017; Yin and Ke, 2017; Guo, 2018; Tuononen et al., 2019).

Specific Generic Skills

The articles that focused on specific generic skills explored critical thinking (10), communication skills (10), collaboration skills (9), creativity and problem-solving skills (8), and self-regulation skills (6). Furthermore, there were a few articles that studied ethical skills (3). These studies utilized various research methods that are presented in greater detail in the following.

Critical Thinking

Studies measuring critical thinking used a variety of methods. In some studies, performance-based assessments were used. These included multiple-choice tests and a few open-ended tasks. Some of the performance assessments used standardized tests (Al-Thani et al., 2016; Ding et al., 2016; Nedelova and Šukolova, 2017; Stone et al., 2017), and in some studies, researchers had created their own performance tasks or used regular examination tasks or course assignments (Sotiriadou and Hill, 2015; Calma, 2017; Utriainen et al., 2017; Lespiau and Tricot, 2018). Many of the studies investigated used self-report surveys to investigate experiences and opinions (Kim, 2015; Sotiriadou and Hill, 2015; Danczak et al., 2017; Ibrahim and Jaaffar, 2017a). One study used an interview as a method (Kim, 2015). In two studies, mixed methods were used, combining two of the above-mentioned methods (Kim, 2015; Sotiriadou and Hill, 2015). In investigating the development of critical thinking, various designs were used. A cross-sectional design was used to compare junior and senior students (Al-Thani et al., 2016), and students in different groups or study fields (Ding et al., 2016; Lespiau and Tricot, 2018). In a few studies, a longitudinal design was used, comparing pre-course and post-course measurements (Kim, 2015; Sotiriadou and Hill, 2015; Stone et al., 2017).

Communication Skills

Many of the studies that focused on students' communication skills also used self-report surveys (Jackson, 2014b, 2016b; Tun Lee-Foo et al., 2015; Mercer-Mapstone and Matthews, 2017; Ibrahim and Jaaffar, 2017a). Typically the studies on students' communications skills utilized multi-method designs, for example combining a survey with written reports (Drury and Muirb, 2014), and writing assignments (Rayner et al., 2016), or multiple-choice tests with long answer questions (Hryciw and Dantas, 2016) and performance assessments (Van Ginkel et al., 2015). In addition, some studies utilized even more complex designs, for example, including dialogue circles, videoing, and team performance measures (Pöysä-Tarhonen et al., 2016), or student surveys, teacher interviews, and student performance in communication tasks (Mercer-Mapstone and Kuchel, 2016).

Creativity and Problem-Solving

Most of the studies that explored creativity and problem-solving used self-report surveys (Wood and Bilsborow, 2014; Techanamurthy et al., 2018; Keinänen and Kairisto-Mertanen, 2019; Mareque et al., 2019). However, there were exceptions as well, especially regarding problem-solving skills. For example, an online game-based assessment tool (Seow et al., 2019), problem-solving tests (Klegeris et al., 2017) and evaluation rubrics were used. Furthermore, many studies explored the influence of some specific factor on the development of the skills, such as innovation pedagogy (Keinänen and Kairisto-Mertanen, 2019), experiential learning pedagogy (Seow et al., 2019), participating in leisure activities (Mareque et al., 2019), or engaging students in complex learning activities (in this case, design-based research) (Wood and Bilsborow, 2014). Mostly the studies focused on exploring students' own perceptions of the level of their skills during studies or upon graduation (Tahir et al., 2017; Techanamurthy et al., 2018) or after a specific pedagogical intervention (Keinänen and Kairisto-Mertanen, 2019; Mareque et al., 2019). Seow et al. (2019) used a quasi-experimental design with a control-group and pre-post test design to explore differences in performance after a specific intervention between the groups. Klegeris et al. (2017) used a cross-sectional design to compare the problem-solving abilities of first- and upper-year students.

Collaboration Skills

Studies measuring collaboration skills utilized surveys (Bravo et al., 2016; Ibrahim and Jaaffar, 2017b; Sridharan et al., 2018; Christensen et al., 2019). Some studies used pre- and post-design to explore students' collaboration skills (Christensen et al., 2019). In addition, evaluation rubrics were used to assess teamwork competencies, including identity, communication, implementation, and regulation (Cela-Ranilla et al., 2014b). Collaboration skills were also explored qualitatively through students' reflection about teamwork.

Self-Regulation Skills

Self-regulation skills were often explored using self-assessments, such as surveys and learning diaries (Ibrahim and Jaaffar, 2017b; Tseng et al., 2019). In addition, evaluation rubrics were

used to evaluate self-management skills including planning, organization, development, and assessment (Cela-Ranilla et al., 2014b).

Ethical Skills

Studies investigating ethical skills utilized surveys and students' written reflections as research methods (Howells et al., 2016; Steur et al., 2016; Taplin et al., 2018).

Higher Education Students' Learning of Generic Skills During Their Studies

Our second aim was to explore whether students learn generic skills in higher education. First, we present the results of the studies that focused on sets of generic skills and then the studies that focused on specific generic skills.

Sets of Generic Skills

Most of the articles that investigated sets of generic skills explored students' perceptions of learning of generic skills. The results showed that the students had learnt the generic skills under investigation well (Bonesso et al., 2015; Joseph et al., 2016; Pirog, 2016; Yin et al., 2016; Guo et al., 2017; Larraz et al., 2017; Sarkar et al., 2017; Tahir et al., 2017; Rozlin et al., 2018; López et al., 2019; Skaniakos et al., 2019). A study of Spanish university students showed that students reported to have learnt best the basic general knowledge in the field of study, learning, information management, problem solving, teamwork, concern for quality and motivation to achieve objectives (López et al., 2019). Martínez-Clares and González-Morga (2018) found that students evaluated that they had developed the most in teamwork as well as in ethical and social commitment. Dinning (2017) showed that 60% or more of the students reported improvements in creativity, problem-solving, persuading and influencing, team work, project management, verbal communication, developing new ideas and making things happen, time management, and flexibility. Similarly, Ssegawa and Kasule (2017) found that students reported having learnt skills well, especially adapting to new environments and willingness to learn new ideas. Another study found that students had learned the ability to articulate employability skills (Tomasson Goodwill et al., 2019). Sarkar et al. (2017) found that students' awareness of employability and underpinning skills increased. Students perceived themselves as capable of working independently (Pop and Khampirat, 2019).

Some of the studies that focused broadly on sets of generic skills found that students had not learned generic skills very well (e.g., Perdigones et al., 2014; Monteiro et al., 2016) or learned only a few of them (Abayadeera and Watty, 2016). Some articles listed generic skills which students experienced that they had learnt the least. These skills included time management, oral communication, negotiation, coping with stress, creating viable solutions, and meeting deadlines, ability to use computers, and teamwork (Perdigones et al., 2014; Jackson, 2016a; Ssegawa and Kasule, 2017). In addition, the generic skills that students perceived having had least learning in included entrepreneurial cooperation, leadership skills, IT skills, and cooperation with people from different cultures (Pirog, 2016), speaking and writing in a foreign language (Conchado et al., 2015; Pirog, 2016;

Martínez-Clares and González-Morga, 2018), as well as conflict management (Bonesso et al., 2015). Chan and Fong (2018) found that students generally rated their current competency level lower than the perceived importance of the generic skills to their future career.

Some articles also found differences in generic skills between the students. For example, students' perceptions of generic skills were the highest for students who were satisfied with the guidance and who had progressed well in their studies (Skaniakos et al., 2019). Disciplinary differences were also found, showing that students from the Faculty of Education had the highest scores, while the lowest means were from students in the Faculty of Mathematics and Science and in the Faculty of Social Sciences (Skaniakos et al., 2019). In addition, it was revealed that students with different motivations as well as students from different university types, disciplines, and university years engaged differently with developing generic skills (Tran, 2017). Students in the flipped group reported higher scores for generic skills than students in traditional lecture courses (Guo, 2019). Kirstein et al. (2019) found that students from poorer quality schools perceived that the education program developed their generic skills more than students from better quality schools. Furthermore, they found that male and African students had lower perceptions of the development of generic skills than female and white students. However, no statistically significant differences were found between students with different home languages (Kirstein et al., 2019).

Specific Generic Skills

Critical Thinking

The findings relating to learning and development of critical thinking skills were contradictory, depending on the study design, methods and sample size. For example, Al-Thani et al. (2016) found that senior students performed better in a thinking test than junior students. However, Ding et al. (2016) did not find differences across different study years, across fields, or across university tiers. Kim (2015) reported in her case study that both graduate and doctoral students tended to show low critical thinking under minimal and enhanced scaffolds. Sotiriadou and Hill (2015) found that students reported some improvement in their critical thinking. However, at the same time, the most versatile levels of critical thinking were challenging to develop (Sotiriadou and Hill, 2015). Danczak et al. (2017) found some development of critical thinking during a course, but it seems that their findings could be explained by the time that the students used in completing their test. In sum, based on the studies covered here, it seems that the development of critical thinking is uncertain or limited (Kim, 2015; Ding et al., 2016; Danczak et al., 2017).

Communication Skills

Studies on communication skills focused on both oral and written communication. Students were found to manage oral communication skills better than their counterparts in working life (Tun Lee-Foo et al., 2015). It was also found that third-year students perceived significantly higher levels of improvement of

oral communication skills than students in the first or second year of studies (Mercer-Mapstone and Matthews, 2017).

Several articles reported improvement in students' scientific writing skills during their studies (Drury and Muirb, 2014; Hryciw and Dantas, 2016; Pöysä-Tarhonen et al., 2016; Rayner et al., 2016). Physiology students were found to improve their performance especially in writing laboratory reports, comparing information from different sources, proposing further experiments, constructing logical arguments, interpreting results, as well as writing hypotheses, introductions, discussions, and conclusions (Drury and Muirb, 2014).

Collaboration Skills

The studies that focused on collaboration skills emphasized the importance of collaboration (Chydenius and Gaisch, 2016; Salleh et al., 2016, 2017) and teamwork skills (García et al., 2016). Many studies found that the students in higher education developed a good level of performance with regard to teamwork skills (Cela-Ranilla et al., 2014b; Tynjälä et al., 2016; Sridharan et al., 2018; Christensen et al., 2019). Bravo et al. (2016) found that students perceived improvement in their understanding of how teams work.

Creativity and Problem-Solving Skills

The studies that focused on exploring students' learning and level of the skills showed contradictory results. Some studies showed that the students had learnt problem-solving and creativity skills well during their degrees (Klegeris et al., 2017; Tahir et al., 2017; López et al., 2019), whereas in some studies this was true only to a certain extent (Calma, 2017; Techanamurthy et al., 2018). Some studies explored whether the learning of these skills could be enhanced with various pedagogical approaches. Most of the studies indicated that the learning of problem-solving and creativity skills can be positively enhanced (Wood and Bilsborow, 2014; Mareque et al., 2019; Seow et al., 2019). An exception to this was a study where only some of the students felt that their skills had improved, whereas others did not (Keinänen and Kairisto-Mertanen, 2019).

Self-Regulation Skills

Studies focusing on self-regulation, self-management, and self-monitoring showed that students were learning these skills. First-year students reported learning time management, learning skills, and self-monitoring skills (Mah and Ifenthaler, 2018). It was also found that senior students report higher performance in self-management skills compared to freshmen (Cela-Ranilla et al., 2014a; Tseng et al., 2019). The students developed a good level of performance with regard to self-management (Cela-Ranilla et al., 2014a).

Ethical Skills

There were some studies that investigated student learning of ethical skills during higher education, and a variety of concepts were utilized. Students in teacher education studies were found to develop in terms of their social responsibility skills (Howells et al., 2016) as well as scholarship and moral citizenship (Steuer et al., 2016).

Factors Enhancing or Impeding Student Learning of Generic Skills

The third aim of this review study was to identify factors that enhance or impede student learning of generic skills. First, the enhancing and impeding factors of the studies focusing on sets of generic skills are presented, followed by the results of the studies focusing on specific generic skills.

Sets of Generic Skills

Both enhancing and impeding factors were identified in the studies that focused broadly on sets of generic skills. Most of the studies highlighted that good and well-organized teaching (Boahin and Hofman, 2014; Guo et al., 2017) and various active learning methods, such as project-based learning (Dinning, 2017; Lee et al., 2019), problem-based learning (Bautista, 2016; Joseph et al., 2016; Martínez-Clares and González-Morga, 2018; Adriaensen et al., 2019; Deep et al., 2019), cooperative learning (El Tantawi et al., 2014; Canelas et al., 2017; Kridiotis and Swart, 2017; Larraz et al., 2017; Martínez-Clares and González-Morga, 2018), flipped classroom (Ng, 2016; Canelas et al., 2017; Guo, 2019), and workshops (Krassadaki et al., 2014; Sarkar et al., 2017) enhanced the learning of generic skills. It was found that students' generic skills developed in disciplinary courses that intentionally integrated the learning of generic skills (Windsor et al., 2014; Rocha, 2015). Additionally, satisfaction with the guidance (Skaniakos et al., 2019), group work (Prokofieva et al., 2015), peer interaction (Guo, 2018), interaction with tutor, and defining the teamwork rules (Carvalho, 2016) were positively related to generic skills learning. Positive course experiences, including appropriate workload, good teaching, clear goals and standards, and emphasis on independence were related to positive evaluations of generic skills development (Liu et al., 2017). In addition, constructively aligned and continuous assessment was found to be positively related to the learning of generic skills (Murdoch-Eaton et al., 2016; Ruge and McCormack, 2017). Peer assessment, feedback, general study guidance, and portfolio (Adriaensen et al., 2019) or other reflection tasks (Tomasson Goodwill et al., 2019) also enhanced the learning of generic skills.

Some studies found that games (Fitó-Bertran et al., 2015; Hermnandez-Lara et al., 2018), role playing (El Tantawi et al., 2014), business simulations (Kelton and Kingsmill, 2016; Levant et al., 2016; Buil et al., 2018), and online tools or competitions (Viviers, 2016; Abdulwahed and Hasna, 2017) enhanced the learning of generic skills. Some studies showed that different kinds of work-integrated learning environments enhanced the learning of generic skills (e.g., Jackson, 2015). For example, work-integrated learning curricula (Jackson, 2015; Smith and Worsfold, 2015; Rambe, 2018), work experience and internships (Levant et al., 2016; Bellew and Gabaudan, 2017; Sonnenschein et al., 2017), service learning (Kao et al., 2014), and workplace simulations (Bautista-Mesa et al., 2018) were perceived to enhance student learning of generic skills. The importance of a mentor during work-integrated learning was highlighted in a few studies (Jackson, 2015; Bellew and Gabaudan, 2017). Furthermore, social media use for employment purposes was positively related to generic skills and internship served as a

mediating mechanism through which social media use affects generic skills (He et al., 2017).

Students' own personal activities also contributed to the learning of generic skills (Ssegawa and Kasule, 2017). Student engagement (Guo, 2018), deep approach to learning, interest, and flow experiences (Buil et al., 2018) were mentioned as promoting factors. A few studies also found that higher initial skills levels was a promoting factor for learning more new skills during the academic year compared to those whose initial skills levels were lower (Feldon et al., 2016) and for students' entrepreneurial intentions (Bonesso et al., 2018).

Some of the studies that we reviewed identified factors that impede or challenge student learning of generic skills. Most of the impeding factors were associated with the learning environment. More precisely, teacher-focused instruction (Guo, 2018), students' passive role in teaching (Guo, 2018), lack of teacher-student interaction (Guo et al., 2017), and overly rapid pace of teaching impeded the learning of generic skills (Viviers, 2016). Poor working life and practice experiences as well as mismatches between employers' and students' expectations were also found to be challenging factors for generic skills development. Tran (2017) found five inhibiting factors: students' working part-time, a lack of information about extra-curricular activities, students' beliefs about participating bringing no benefits, competition with curriculum-based activities, and unprofessional organization of these activities. Additionally, it was shown that students' surface approach to learning (Guo et al., 2017), surface motives and poor study strategies (Yin et al., 2016) were related to their poor learning of generic skills.

Specific Generic Skills

Critical Thinking

Asking students about their experiences on factors that enhance their learning of critical thinking, one study found that inquiry-based learning methods were helpful (Danczak et al., 2017). It has also been suggested that instruction that takes critical thinking into account could be a powerful tool for enhancing students' level of critical thinking (Al-Thani et al., 2016). For example, scaffolding and sequential assignments have been found to improve students' critical thinking skills in some studies (Sotiriadou and Hill, 2015) but not always (Kim, 2015). Research on performance-based assessment has shown that students' primary knowledge enhances performance and motivation in reasoning (Lespiau and Tricot, 2018).

Communication Skills

In several studies, various e-learning resources were found to enhance students' written communication skills. A specific e-learning environment that provides resources for learning discipline-specific content and writing was found to improve both students' written communication skills and content understanding (Drury and Muirb, 2014). A scaffolded learning approach including both online writing tasks and active-learning lectures, small-group discussions, and collaborative workshops improved students' scientific literacy skills (Hryciw and Dantas, 2016). Additionally, role models in terms of communication skills, feedback on performance (Van Ginkel et al., 2015),

mentoring, and peer collaboration were found to be influential factors for student learning (Jackson, 2014b, 2016b). Also, explicit teaching of science communication skills embedded in courses was found to be influential (Mercer-Mapstone and Kuchel, 2016).

Collaboration Skills

Studies focusing on collaboration skills indicated that factors related to teaching and learning environments were found to enhance the learning of generic skills. Team-based learning in accounting courses enhanced student perceptions of their ability to work effectively in diverse teams, as well as other teamwork abilities such as cultural diversity, leadership and planning, and implementation (Christensen et al., 2019). Students were found to learn collaboratively when working on their study task in a culturally mixed small group (Daly et al., 2015). Bravo et al. (2016) showed that teamwork processes have significant effects on improvements in teamwork skills, and thus teachers should use assignments that require managing these teamwork processes rather than focusing solely on the success of the assignment. Students perceived six factors that contribute to positive student teamwork experiences: shared team goals; cultural diversity; adaptable work skills; challenging task context; collaborative research; cross-functional teams (Volkov and Volkov, 2015). Sridharan et al. (2018) found that peer assessment improved collaboration skills. Digital games provide an excellent online learning environment for students to work in and improve their teamwork skills (Cela-Ranilla et al., 2014b). Online learning environments utilizing problem-based learning, and providing versatile support and encouragement for continuous assessment, were reported to enhance students' teamwork skills (García et al., 2016). Work-integrated learning helped undergraduates to develop their interpersonal skills (Ibrahim and Jaaffar, 2017a).

Creativity and Problem-Solving Skills

Most of the studies explored the effect of implementing different pedagogical approaches or interventions to enhance students' learning of problem-solving, innovation, and creativity skills. For example, a design-based research approach was found to improve students' creativity skills (Wood and Bilsborow, 2014). Innovation pedagogy enhanced students' learning of different innovation competences, and introducing an experiential learning pedagogy was found to improve students' problem-solving skills (Seow et al., 2019). Various arts-related leisure activities were found to be positively related to creativity (Mareque et al., 2019). Incorporating generic skills (including creativity and problem-solving) within curricula and academic courses was found to be correlated with students' satisfaction in learning those skills (Tahir et al., 2017). Some studies also indicate that students' problem-solving skills evolve along with university experience, further suggesting that some instructional methods might be especially beneficial in enhancing the learning of those skills (such as problem-based learning, case studies, team-based learning) as opposed to traditional lecture-style courses (Klegeris et al., 2017).

Self-Regulation Skills

Several enhancing factors of self-regulation skills were indicated by the studies. The use of teaching and learning materials

improved the attitude of learners to the development of self- and social competencies (Edeling and Pilz, 2016). In addition, work-related factors such as work-integrated programs (Ibrahim and Jaaffar, 2017b) and the training company enhance students' learning of self-management skills (Edeling and Pilz, 2016). Furthermore, it was also found that a 3D simulation learning environment and digital games (Cela-Ranilla et al., 2014a,b) enhanced student learning of self-management skills.

Ethical Skills

It was found that reflective writing tasks as well as other learning and assessment experiences provided during the course enhanced student teachers' learning of social responsibility skills (Howells et al., 2016). Taplin et al. (2018) found that use of role-play enhanced student learning of ethical skills.

DISCUSSION

Our systematic review study contributes to the research on generic skills by structuring the current research in the field, elaborating the concepts and theories related to learning generic skills, and clarifying the methods utilized in the empirical studies. The study revealed the remarkable variation in concepts and their definitions, research methods, and the way generic skills were measured. The conceptual variation manifested itself in many different ways. Most of the reviewed studies investigated sets of generic skills and used the term generic skills or other similar concept, such as employability skills, transferable skills, soft skills, graduate attributes, or generic competencies. These results reflect those of Lizzio et al. (2002) and Barrie (2006), who also found that generic skills are known by several other terms. The number of generic skills explored ranged from one or two skills to several dozen. The present study thus clearly shows that "generic skills" is used as an umbrella term, which can include various wide-ranging skills. Some of the articles framed their research with generic skills but focused more specifically on individual specific generic skills. The studies exploring specific skills had their focus on one of six generic skills. These skills were critical thinking, communication skills, collaboration skills, creativity and problem-solving skills, self-regulation skills, and ethical skills. Similar skills have been found in a previous review study that explored generic competences and found that the most frequently appearing generic competences were a set of conceptual skills, people skills, and personal skills (Strijbos et al., 2015).

It was somewhat surprising that the studies that focused on sets of generic skills most often measured professional skills such as professionalism and leadership skills. These skills are not higher-order thinking skills, which are outlined as the key skills and aims of higher education (Strijbos et al., 2015; OECD, 2019). The high amount of professional skills in the articles studied may be due to the emphasis on working life. Consequently, in many studies the learning of generic skills was justified by the need for these skills in working life. After the professional skills, analytical skills, applying knowledge, communication, and collaboration were most often operationalized as generic skills in the surveys. These skills can be considered higher-order thinking skills and important for professionals in various fields. There is surprisingly

little research on generic skills and their relation to learning processes, although these skills are needed in quality learning and studying (Badcock et al., 2010; Arum and Roksa, 2011; Tuononen and Parpala, 2021). In addition, these skills are important for lifelong learning.

A more accurate analysis of the articles focusing on sets of generic skills showed inconsistency in the instruments used. Almost every study introduced its own survey instrument to measure generic skills. In these studies, the operationalization of the measured skills was often incoherent, and they failed to give an explicit definition of generic skills. The present review study confirmed the previous findings, which have demonstrated several problems in surveys in the research field of generic skills. For example, abstract or vague expressions and double-barreled items in the questionnaires have been found (Braun et al., 2012).

Most of the studies in this review used self-report methods with a cross-sectional study design. The studies with a longitudinal design focused mostly on a short period of time, e.g., one course or one semester. While the methods chosen may reflect a lack of long-term research resources, more thought should be put into methods to capture actual skills and their development. Self-report measures only capture students' perceptions and experiences, while performance-based assessments would enable a deeper understanding of students' competency (Zlatkin-Troitschanskaia et al., 2015). Furthermore, while cross-sectional studies do not inform us about the development of generic skills, even longitudinal designs that focus on short periods of time can provide inaccurate information about actual development of skills. The learning of generic skills takes time (Arum and Roksa, 2011; Hyytinen et al., 2019; Muukkonen et al., 2019), and such designs may not be able to capture the development, or the development that they capture may not be lasting. Additionally, only a few studies used performance-based assessments to explore generic skills. This was somewhat surprising, since investigating skills with performance-based assessment would be ontologically and methodologically reasonable (McClelland, 1973; Ercikan and Oliveri, 2016; Hyytinen et al., 2021). Additionally, more performance-based assessments of generic skills with larger data sets are needed (Al-Thani et al., 2016). One another methodological aspect relates to the level of analysis. Most of the articles utilize group-level analysis, which may not reveal individual variation in perceptions of learning generic skills.

Conceptual and methodological shortcomings make it difficult to compare studies, and build a cumulative understanding about the status of generic skills in higher education. Additionally, each of the studies focuses on different sets of skills, which complicates the matter. The studies that focus on specific individual skills such as critical thinking, problem-solving or collaboration skills are often more advanced in their theoretical and conceptual framework, as well as methods, compared with studies that focus on a varied set of skills. This is probably due to the conceptual clarity in the field of the respective skill, e.g., critical thinking. In order to contribute to higher education research, studies of generic skills need to strive for increased clarity and coherence.

Our aim was also to explore how higher education students have learned generic skills during their studies. A coherent picture of the learned generic skills is relatively challenging to capture because the articles have focused on different sets of generic skills with various surveys. Although students in many studies perceived that they had learned generic skills well, some studies indicated that their learning of generic skills was limited. Additionally, some studies indicated that there were differences between the students in learning generic skills, for example, regarding their discipline. Furthermore, it is also important to remember that most of the studies reviewed mainly explored students' own experiences in learning generic skills, not their actual level of generic skills (cf. Braun et al., 2012; Zlatkin-Troitschanskaia et al., 2015). However, it is noteworthy that there was also contradictory evidence about students' generic skills learning based on the studies that used performance-based assessment and whether these skills develop during studies.

The present review study also identified enhancing and impeding factors that were found to be associated with learning generic skills in the studies. The results indicated that most of these factors were contextual, relating to the teaching and learning environment, rather than focusing on individual factors. Active learning methods that emphasize students' activity and role in the learning process were most often found to be enhancing factors. In addition, the role of different digital learning environments such as games and online tools in the learning of generic skills was investigated, and they were usually perceived as useful. Work-based learning and work-related projects were also perceived as useful. It was interesting that previous knowledge and initial skill level were related to the learning of new generic skills. This finding supports evidence from previous studies (e.g., Richardson et al., 2012). In addition, students' own personal activities, such as student engagement, deep approach to learning, and interest were individual factors that were found to enhance the learning of generic skills (cf. Arum and Roksa, 2011). The impeding factors were also mainly associated with the learning environment. For example, teacher-focused instruction, lack of interaction, and poor working life and practice experiences were found to be negatively related to the learning of generic skills.

LIMITATIONS

Some limitations of this review study have been identified. First, these articles were searched for using the term generic skills, not specific skills. Therefore, the sample of critical thinking studies, and certain other skills, does not represent all research in the field. Second, we only included articles for 5 years in the analysis, and thus the sample does not comprehensively describe the research of generic skills and how generic skills research has developed during the 2010s. The number of studies published was so large that we were not able to include more years in this review study. Third, the enhancing and impeding factors found in the studies were based mainly on self-reports. Thus, how much they actually enhance or impede the learning of generic skills has not been explored in these studies.

CONCLUSIONS

The present study shows that there is a lot of research activity in this area, indicating the importance and relevance of generic skills research. To ensure the development of research on generic skills, it is essential to enhance the dialogue between theoretical, methodological, and empirical perspectives to extend previous work in the field. The results of the present study demonstrate that the challenges in exploring generic skills are both methodological and theoretical in nature (cf. Barrie, 2006; Braun et al., 2012; El Soufi and See, 2019). The problem is that the results do not accumulate because so many different theoretical frameworks, concepts, definitions, and instruments are used. Therefore, we suggest that existing valid instruments should be utilized when new studies are constructed. In this way, the definition of concepts will become clearer and valid instruments will evolve. Generic skills can be explored using self-reports if valid instruments are used. In addition, self-reports can be used to develop students' reflection skills and help students to recognize and evaluate their generic skills (Kyndt et al., 2014). However, this review study showed that intervention and longitudinal studies are needed but such study designs are demanding and require greater resources. In the future, it would be interesting to explore how the learning of generic skills progresses during studies and how a high level of certain

skills can promote the learning of other skills. This review study advances new research on higher education student learning of generic skills and also contributes to the practical development of teaching and learning in higher education by indicating the enhancing and impeding factors.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

TT, HH, and AT contributed to conception and design of the study. TT and HH conducted literature search. TT, HH, AT, and KK wrote other sections of the manuscript. All authors analyzed and wrote the results. All authors contributed to manuscript revision, read, and approved the submitted version.

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