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Learning profiles and their relation to the experiences of learning generic skills at the end of the first year of university study

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University students' approaches to learning and generic skills have important consequences for studying and success in higher education. However, person-oriented research, which explores how students with different learning profiles evaluate their learning of individual generic skills, has not been the core interest of previous studies. This study investigates the learning profiles of university students ($N = 901$) in two disciplines and their relations to the experiences of learning critical thinking, collaboration and communication at the end of the first study year. The interrelations of the variables were analyzed with correlations and Latent Profile Analysis (LPA) estimating auxiliary variable relation. LPA yielded three learning profile groups that differed from each other in their approaches to learning: unreflective, dissonant and deep-organized, which, respectively, comprised 7, 58 and 35% of the sample. The experiences of learning generic skills of the three learning profiles varied. The comparison of the profiles showed that students representing the deep-organized profile scored highest on all measured generic skills compared to the other two learning profiles.

KEYWORDS

approaches to learning, learning profiles, generic skills, higher education, critical thinking, communication, collaboration

1 Introduction

Students do not begin their university studies at the same starting point. A new learning context with new goals may challenge their ways of studying. The student's first year of studying has been shown to be critical for learning and success at university (Van der Zanden et al., 2019). There is evidence that first-year students' approaches to learning vary (Parpala et al., 2010; Haarala-Muhonen et al., 2017). Approaches to learning refers to the ways in which students intend to approach their studying and learning (Lindblom-Ylänne et al., 2019). Earlier research has found a person-oriented approach to be successful in understanding the variation among undergraduate students as it reveals their learning profiles (Asikainen et al., 2020; Parpala et al., 2021; Tuononen et al., 2022b).

Alongside approaches to learning, recent studies have suggested that novice students' generic skills, such as critical thinking and communication skills, are at the core of the preparedness for higher education (Arum and Roksa, 2011; Kleemola et al., 2022). Generic skills, sometimes called meta-skills, refer to higher-order skills that can be applied across all disciplines (cf. Tuononen et al., 2022a). Such skills enable students to learn and apply field-specific knowledge (Star and Hammer, 2008; Arum and Roksa, 2011; Hyytinen et al., 2019).

As such, they are an object of learning on the one hand but they are also important determinants of a student's study path in university (Van der Zanden et al., 2019). Although prior research has shown that there is substantial variation in first-year undergraduate students' generic skills (Badcock et al., 2010; Arum and Roksa, 2011; Evens et al., 2013), the factors explaining this variation have received limited research attention (Kleemola et al., 2022).

Whereas a positive relationship between generic skills and approaches to learning are generally presumed, current research offers contradictory findings about this aspect (see, e.g., Nelson Laird et al., 2014; Sharp et al., 2017; Hyytinen et al., 2018). Furthermore, prior research on approaches to learning has often concentrated on a set of generic skills instead of focusing on the relationship between approaches to learning and individual generic skills. This is challenging because the concept of generic skills covers numerous different skills (Barrie, 2006; Braun et al., 2012; El Soufi and See, 2019; Tuononen et al., 2022a). Moreover, understanding how first-year students with different combinations of approaches to learning (i.e., different learning profiles) evaluate their learning of generic skills seems to be lacking in current research. Therefore, the aim of the current study is to examine, utilizing a person-oriented approach, the relationship between approaches to learning and experiences of learning three generic skills, namely critical thinking, collaboration and communication skills, at the end of first year of study in law and social science. In both disciplines, critical thinking, collaboration and communication are key generic skills that students are expected to learn during their university studies (Abrandt Dahlgren et al., 2006; Drennan and Keyser, 2022; Haarala-Muhonen et al., 2022). Law and social sciences have a lot in common, for example, they both address the questions related to society. Yet, they are two academic disciplines with specific characteristics. Exploring associations between learning profiles and generic skills at the end of the first study year allow us to understand law and social science students and their individual needs better.

2 Theoretical framework

2.1 Approaches to learning and learning profiles

Research on approaches to learning dates back to the 1970s, when Marton and Säljö (1976) introduced deep and surface processing as qualitatively different intentions toward study learning materials. Deep processing referred to the intention to understand the meaning of learning materials whereas surface processing was related to memorizing the content (Lindblom-Ylänne et al., 2019; Lonka et al., 2021). Later, the use of the term approaches to learning became prevalent in this research tradition. The term refers not only to students' intention but also to their study processes (Asikainen and Gijbels, 2017; Lindblom-Ylänne et al., 2019). Previous research has identified three approaches to learning, namely, a deep approach, a surface approach, and organized studying (Asikainen and Gijbels, 2017; Lindblom-Ylänne et al., 2019). Students who apply a deep approach to learning aim to understand information through generating a coherent entity of the topic in question with reflection from various perspectives (Asikainen et al., 2014; Postareff et al., 2014). In turn, the surface approach to learning is considered to be an aim to

memorize and repeat information by focusing on bits and pieces without the intention of comprehending the bigger picture (Lindblom-Ylänne et al., 2019; Parpala et al., 2021). According to recent research conducted by Lindblom-Ylänne et al. (2019), at the core of the surface approach, rather than the memorization of information, are the difficulties met when relating fragmented ideas to each other and understanding the contents as whole. Thus, the surface approach to learning has been renamed as the unreflective approach. In contrast, the third dimension of approaches to learning, organized studying, is used to refer to the ways students manage their time and study efforts (Entwistle and McCune, 2004). Thus, organized studying is more of an approach to studying rather than an approach to learning.

In the light of previous studies, approaches to learning are understood to some extent to be related to students' perceptions of the learning context (Parpala et al., 2010; Asikainen et al., 2014; Varunki et al., 2017). As an exception to this, there are students who have a very strong intention to understand and who seem to have more resistance to contextual factors (Lindblom-Ylänne et al., 2013; Postareff et al., 2014). However, in general, previous research indicates that, rather than being stable, students' approaches to learning tend to change during their studies depending on their study context (e.g., Asikainen et al., 2014). Thus, during the first study year, students most likely need to adopt new ways of learning.

Previous research has shown that approaches to learning vary among first-year students (Parpala et al., 2010; Varunki et al., 2017). Additionally, disciplinary differences have been found (Parpala et al., 2021). In their study, Haarala-Muhonen et al. (2017) found that while most first-year law students emphasized deep approaches to learning and organized studying, some students applied a surface approach. Similar findings have also been reported elsewhere regarding students who are already advanced in their studies (Parpala et al., 2021). Additionally, it has been shown that students of social science most typically adopt a deep approach to learning (Parpala et al., 2010). There is also evidence that a surface approach may actually increase during the first year if the learning context does not support a deep approach to learning (Varunki et al., 2017).

The dimensions of approaches to learning have been found to form different combinations among university students. For example, some students have relatively high scores on a deep approach to learning and low scores on a surface approach and organized studying, and the other way around among other students (Asikainen et al., 2020; Parpala et al., 2021; Tuononen et al., 2022b). Recently, when utilizing a person-oriented method to analyze the data (Lonka et al., 2021), three distinct learning profiles were identified, based on combinations of approaches to learning: (1) students applying a deep and organized approach, (2) students applying a deep and unorganized approach, (3) dissonant profiles, in which the scores for deep and unreflective approaches were both either high or average (Parpala et al., 2021; Mendoza et al., 2022; Tuononen et al., 2022b). Other combinations of approaches to learning have also been found in which the dissonant profile is substituted with students who apply a surface or unreflective approach (Parpala et al., 2010; Asikainen et al., 2020). Additionally, four-profile models, instead of three, have also been reported (Haarala-Muhonen et al., 2017; Asikainen et al., 2020; Parpala et al., 2021). Such earlier studies, however, have often used nonmodel-based methods as cluster analysis to identify individual variation in approaches to learning (see Asikainen et al., 2020; Mendoza et al., 2022; Tuononen et al., 2022b). Furthermore, previous

person-oriented studies have often focused on students' approaches to learning at a more advanced stage of studies. Thus, to obtain a more profound understanding of different learning profiles among first-year students, more research is needed using model-based methods (i.e., latent profiles analysis) in classifying students into profile groups (*cf.* Parpala et al., 2021).

2.2 Critical thinking, communication and collaboration as important generic skills

Research focusing on generic skills and competencies has increased in higher education over the last decade (Van Damme and Zahner, 2022; Tuononen et al., 2022a). Generic skills are a part of the broader concept of competences. Competencies can be conceptualized as an ability to use specific combinations of skills, knowledge and attitudes (Baartman and Ruijs, 2011). Generic skills are the universal skills that are applied across different disciplines and occupational contexts (Virtanen and Tynjälä, 2019; Tuononen et al., 2022a). There is no one definitive list of generic skills. Instead, it is an umbrella term covering various sets of skills. While remarkable variation in the concepts and operationalization of generic skills has been found (Barrie, 2006; Braun et al., 2012; El Soufi and See, 2019; Tuononen et al., 2022a), researchers have acknowledged the importance of learning generic skills in the context of higher education. For example, there is evidence that generic skills are related to adjustment and adaptation to higher education (Van der Zanden et al., 2019; Kleemola et al., 2022) as well as progress and success in studies (Paul et al., 2009; Tuononen and Parpala, 2021).

Generic skills are often measured using one scale to present a set of generic skills (e.g., Liu et al., 2017; Tuononen et al., 2022a) even though it is questionable to bundle distinct skills together into one measurement. It has been found, for instance, that students' different generic skills develop unevenly. In other words, a student might be able to identify and evaluate information, yet at the same time struggle with other skills, such as arriving at a conclusion or producing arguments (Hyytinen et al., 2018). Additionally, previous studies show that different generic skills contribute to learning in various ways (Tuononen and Parpala, 2021; Räisänen et al., 2022). It follows that the associations depend on the skills measured, which indicates a need to explore the different generic skills separately. Thus, in this study, we focus on specific three generic skills that students are expected to learn during their university studies: critical thinking, communication and collaboration (see European Commission, 2013; Liu et al., 2017; Van Damme and Zahner, 2022). Previous research has also shown that critical thinking, communication and collaboration skills are essential skills needed in working life (Tuononen et al., 2019b). These skills are also most often measured in previous studies (Tuononen et al., 2022a).

Critical thinking refers to the ability to elaborate a problem, to evaluate the trustworthiness of information associated with a situation, to consider various perspectives, to apply that information to solve a problem, to reach a well-reasoned conclusion and to communicate it through argumentation to others (Kleemola et al., 2022). *Collaboration* refers to one's ability to work and cooperate with others. It is closely related to communication skills in that, for example, information sharing could be seen as an integral part of collaboration (Hinyard et al., 2019). *Communication* skills, ranging from verbal (written or oral) to non-verbal communication, are regarded as the abilities one

uses when giving and receiving different kinds of information and communicating it to different audiences. The ability to communicate effectively is essential for learning from the very beginning of higher education studies (Kleemola et al., 2022) and it is also considered central to academic careers (Drennan and Keyser, 2022).

Previous research has shown that generic skills are intertwined with learning domain-specific knowledge and skills (Star and Hammer, 2008; Arum and Roksa, 2011). These skills enable students to draw on their field-specific knowledge in a variety of situations. For instance, in the context of legal education it is not enough that students learn the theory of the areas of law, but they must also be able to learn to use legal knowledge during their studies (Hewitt, 2015; Haarala-Muhonen et al., 2022). This applies to all fields of study. Effective communication skills are needed to make one's own conclusions visible to others. Critical thinking skills, on the other hand, help students to analyze and apply domain-specific information in order to make conclusions (Arum and Roksa, 2011; Hyytinen et al., 2019). Additionally, learning critical thinking alongside domain-specific knowledge enables students to adopt analytical and critical perspectives on the practices within the domain (Star and Hammer, 2008).

There is increasing evidence that the level and quality of the generic skills of first-year students vary substantially (Evens et al., 2013; Hyytinen et al., 2018; Van der Zanden et al., 2019; Kleemola et al., 2022). In addition, some research indicates that the development of generic skills, such as critical thinking and written communication skills, is limited during tertiary education (Badcock et al., 2010; Arum and Roksa, 2011). Generally, university students have been found to develop theoretical knowledge more than generic skills during their studies (Edvardsson Stiwne and Jungert, 2010; Monteiro et al., 2016). Several research studies have pointed out that collaboration and communication skills have been perceived as the least developed (Tuononen et al., 2019a). Nevertheless, disciplinary differences in learning generic skills have been found (Badcock et al., 2010). Graduates of social science have stated that their critical thinking and communication skills have developed during their university studies (Abrandt Dahlgren et al., 2006; see also Kember, 2009). In contrast, it has been suggested that law graduates are challenged in written communication even though the ability to communicate is crucial for success in the legal profession (Drennan and Keyser, 2022).

2.3 The relationship between approaches to learning and different generic skills

The connections between the approach to learning and generic skills have been investigated in some prior studies. In general, these studies have shown a positive relationship between a deep approach to learning and generic skills and a negative relationship with a surface approach (Kreber, 2003; Nelson Laird et al., 2014; Sharp et al., 2017). In addition, organized studying has found to be positively related to generic skills (Kreber, 2003; Tuononen et al., 2019a). Furthermore, Lindblom-Ylänne et al. (2019) found that a deep approach to learning had a stronger relationship to learning generic skills than organized studying and an unreflective approach. In addition, they revealed that the relationship between approaches to learning and generic skills is bidirectional and that generic skills are especially intertwined with the deep approach to learning. For example, applying a deep approach to

learning requires the use of generic skills, such as the ability to analyze information, while, on the other hand, applying a deep approach enables the development of generic skills.

Although little attention has been paid to the interconnections between the dimensions of approaches to learning and individual generic skills, there is prior research that has focused on the associations between approaches to learning and critical thinking (see Nelson Laird et al., 2014; Wang et al., 2015; Hyytinen et al., 2018). Theoretically a deep approach to learning bears similarities to critical thinking (i.e., both involve an intention to interpret information and consider various perspectives in order to comprehend the bigger picture; Nelson Laird et al., 2014; Hyytinen et al., 2018). Nevertheless, the empirical findings have been contradictory. On the one hand, there is some empirical evidence that a deep approach to learning and learning to think critically are related to each other (Kreber, 2003), whereas other studies have found no connections between these two (Nelson Laird et al., 2014; Wang et al., 2015; Hyytinen et al., 2018).

Thus, more research is needed to clarify the associations between the dimensions of approaches to learning and individual generic skills. Moreover, person-oriented research, which explores how students with different learning profiles evaluate their learning of individual generic skills, has not been the core interest of previous studies. In this study, therefore, we set out to explore, using a person-oriented approach, the relationship between the dimensions of approaches to learning and students' own perceptions of their learning of critical thinking, collaboration and communication.

2.4 Aims

Because the first year of university study forms a crucial foundation for the later stages of the individual learning path (Haarala-Muhonen et al., 2017; Van der Zanden et al., 2019; Kleemola et al., 2022), the present study aims to increase our understanding of the associations between the approaches to learning and the experiences of learning generic skills of undergraduate students in two disciplines at the end of their first year. More precisely, by using a person-oriented approach, the study examines different learning profiles and makes an analysis of how first-year law and social science students with these profiles experience the learning of critical thinking, collaboration and communication skills during their first-university year. The research questions of the study are posed as follows:

- (1) What kinds of learning profiles can be identified?
- (2) What kinds of disciplinary differences in learning profiles can be found?
- (3) How do these profiles differ in terms of the learning of critical thinking, collaboration and communication skills at the end of the first study year?

3 Methods

3.1 Context and participants

The participants of the present study ($n=901$) were first-year students from the three-year Bachelor's degree programs in Law and

Social Sciences at a Finnish research-intensive university. The participants were at the same phase of their studies, that is, at the end of their first study year. However, in the Faculty of Law students are advised to follow the structured and timetabled major subject study plans, while the Faculty of Social Science provides students with more flexible possibilities for individual study paths, both in terms of selecting course modules and minors and progression in their degree (see Hailikari et al., 2020). In social sciences, the students participate in lectures, group works and seminars during their first-year and the size of the courses varies from small to moderate according to the students' own course choices. In contrast, in law, the whole year cohort participates in the courses in which lectures alternate systematically with legal case exercises.

The students filled in the electronic questionnaire as a part of their studies at the end of their first year of study. All students were invited to answer the questionnaire. Participation was voluntary, and informed consent was obtained. This study did not involve participants under the age of 15. Furthermore, it did not cause any exposure to strong stimuli, which could have caused long-term mental harm. Following these principles of the Finnish National Board on Research Integrity (2019), this study did not require separate ethical review or approval in Finland. The responses of those students who gave permission were used in the present study. Of the participants, 464 (52%) were law students and 437 (48%) social science students. The data from three academic years were used: law students in 2017 ($n=184$), 2018 ($n=134$), 2019 ($n=146$), and social science students in 2017 ($n=130$), 2018 ($n=160$), 2019 ($n=143$). Yearly, approximately 250 new students start their studies in the Faculty of Law and 330 in the Faculty of Social Sciences.

3.2 Materials

Students' *approaches to learning* were measured using the HowULearn questionnaire (Parpala and Lindblom-Ylänne, 2012). The 12 items have been modified for HowULearn from the Approaches to Learning and Studying Inventory (ALSI, Entwistle and McCune, 2004) and the Learning and Teaching Questionnaire (LSQ, Entwistle et al., 2003). In addition, two items were modified and added from the Revised Learning Process Questionnaire (R-LPQ9, Kember et al., 2004). The scales measuring approaches to learning are deep approach, unreflective approach (prev. Surface approach) and organized studying, each measured by four items. Items measuring approaches to learning have been widely used and validated in various contexts (e.g., Herrmann et al., 2017; Tuononen et al., 2022b).

Students' *experiences of learning generic skills* were measured using eight items, which were formulated based on the previous studies and literature (Course Experiences Questionnaire (CEQ); Wilson et al., 1997, Tuononen et al., 2019a). Students were asked to evaluate how they have learned different generic skills during their first year of university studies. The same instrument has been used in a recent study in the context of medical studies (Räisänen et al., 2022). Räisänen et al. (2022) found a three-factor solution, labeled as collaboration and communication, analyzing, and problem-solving skills. A 5-point Likert scale (1 = totally disagree, 5 = totally agree) was used to measure both approaches to learning and experiences of learning generic skills.

3.3 Data analysis

First, a missing value analysis was applied to the data and no missing values were observed. Then, the confirmatory factor analysis (CFA) was conducted to test the factor structure of the approaches to learning inventory. The goodness-of-fit of the models was tested with the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Standardized Root Mean Square Residual (SRMR) (Hu and Bentler, 1999; Harrington, 2009). The fit indices for the three-factor solution were 0.90 for CFI, 0.87 for TLI, 0.06 for SRMR. The value of the CFI and SRMR indicated an acceptable fit between the model and the observed data. However, the value of the TLI remained modest. Next, we ran the CFA for the two student groups separately. The fit indexes for the three-factor solution were also reasonable in both study programs (law: CFI=0.90, TLI=0.86, SRMR=0.06; social science: CFI=0.90, TLI=0.87, SRMR=0.07). Cronbach's Alphas were 0.76 for deep approach, 0.71 for unreflective approach, and 0.68 for organized studying.

As the questionnaire for generic skills was used for the first time in the Bachelor's degree programs in Law and Social Science, the functionality of eight items was examined in detail using an exploratory factor analysis (principal axis factoring with varimax rotation; see Costello and Osborne, 2005). An examination of the Kaiser-Meyer Olkin measure of sampling adequacy suggested that the samples for generic skills were factorable (KMO=0.82). The analysis yielded a two-factor solution with factors labeled: Critical thinking (5 items, involving analyzing and problem solving, see Räsänen et al., 2022) and Collaboration and communication (3 items). All loadings were above the desired 0.32 mark (Tabachnick and Fidell, 2014). Communalities varied from high to low and two items remained below the desired 0.40 (Costello and Osborne, 2005). The resulting two-factor solution was theoretically sound, and it was tested with confirmatory factor analysis. Its goodness-of-fit was reasonable for the whole data (CFI=0.91; TLI=0.87; SRMR=0.06), as well as in both disciplines (law: CFI=0.92, TLI=0.88, SRMR=0.06; social science: CFI=0.92, TLI=0.89, SRMR=0.06). Cronbach's Alphas were 0.75 for critical thinking and 0.85 for collaboration and communication. Appendix A shows the scales and items.

After that, the data were analyzed to explore the descriptive statistics for each variable. Pearson correlation was used to explore how the approaches to learning and experiences of learning critical thinking, collaboration and communication were related to each other. The next phase of the analysis entailed identifying learning profiles based on the variation within approaches to learning using latent profile analysis (LPA; Spurk et al., 2020; Lonka et al., 2021). We used a stepwise approach to identify the number of latent profiles, starting with one profile and then adding profiles. In each step, we compared the fit indices between the models, (see Table 1; Spurk et al., 2020). Bayesian Information Criterion (BIC and adjusted BIC), Akaike Information Criterion (AIC), and a Vuong-Lo-Mendell-Rubin and Lo-Mendell-Rubin adjusted likelihood ratio test (VLMR and LMR) were used as the statistical criteria in order to make a decision on the final number of profiles. We also considered the classification quality (i.e., entropy value) and theoretical relevance of the model for choosing the best-fitting model. Finally, to examine the differences between the profiles in terms of disciplines, experiences of learning critical thinking as well as collaboration and communication, an auxiliary Mplus command was used (Muthén and Muthén,

1998/2017; Lonka et al., 2021). For continuous variables (i.e., experiences of learning critical thinking and communication and collaboration), we analyzed differences in probabilities across profiles using the BCH procedure, while for categorical variables (i.e., disciplinary membership) the DCAT procedure was used. Exploratory factor analysis was conducted with SPSS 25. CFA and LPA were conducted with Mplus version 8.4 (Muthén and Muthén, 1998/2017).

4 Results

4.1 Descriptive statistics

Table 2 provides the descriptive statistics and Pearson's correlation for the scales measuring approaches to learning and experiences of learning generic skills. All the dimensions of approaches to learning correlated with each other. A deep approach and organized studying were positively related to both dimensions of learning generic skills, critical thinking and collaboration and communication. In contrast, an unreflective approach correlated negatively with experiences of learning generic skills.

4.2 Learning profiles

LPA was used to classify different undergraduate student profiles related to their approaches to learning. The model with a lower information criteria (i.e., BIC, Adjusted BIC, and AIC value) was considered to provide a better fit, and a low value of p of VLMR and Lo-Mendel-Rubin Adjusted LRT test suggested that the model with one less profile should be rejected in favor of the estimated model (Spurk et al., 2020; Lonka et al., 2021). A series of LPAs indicated that the information criteria were slightly lower for the four-profile than the three-profile model (see Table 1). However, the p -values supported the three-profile solution. The model with three student profiles also had a clear interpretation and contained profiles with sufficiently large memberships. Figure 1 shows the three-profile solution.

The first profile was the smallest ($n=60$; 7%). In this profile, the highest scores on unreflective learning, the lowest scores on deep approaches to learning, and average scores on organized studying distinguished students into this group. This profile was labeled as an unreflective learning profile. The second profile was the largest ($n=525$; 58%). In this profile, the scores on the unreflective approach and organized approaches were average and the deep approach was slightly above average, thus this profile was labeled as dissonant. In the third profile ($n=316$; 35%), students had the highest values in the deep approach and organized studying, and the lowest scores on unreflective in contrast to the other two profiles. This profile was named deep-organized.

4.3 Disciplinary differences in learning profiles

Next, we examined the disciplinary differences between the three learning profiles (see Table 3). Law students were more likely to belong to the unreflective profile (odds ratio 4.063) or dissonant profile (odds

TABLE 1 Information criteria values for different profile solutions in LPAs.

Number of profiles	AIC	BIC	Adjusted Bic	p_{VLMR}	p_{LMR}	Entropy	Group sizes
1	5640.031	5668.852	5649.797	-	-	-	901
2	5507.615	5555.650	5523.892	0.0000	0.0000	0.555	670, 231
3	5484.770	5552.019	5507.558	0.0342	0.0379	0.607	60, 525, 316
4	5473.744	5560.207	5503.042	0.1587	0.1674	0.577	498, 72, 59, 272

AIC, Akaike Information Criterion; BIC, Bayesian Information Criterion; adjusted BIC, adjusted Bayesian Information Criterion; p_{VLMR} , Vuong-Lo-Mendell-Rubin likelihood ratio test; p_{LMR} , Lo Mendell-Rubin-adjusted likelihood ratio test.

TABLE 2 Correlations and descriptive statistics of the scales.

	1	2	3	4	5
1. Deep approaches	1				
2. Unreflective	-0.329**	1			
3. Organized	0.215**	-0.093**	1		
4. Critical thinking	0.486**	-0.217**	0.234**	1	
5. Collaboration and communication	0.256**	-0.070*	0.118**	0.560**	1
M	3.81	2.54	3.31	3.69	3.32
SD	0.63	0.68	0.76	0.59	0.88

** $p < 0.001$.

ratio 5.016) rather than the deep-organized profile compared with the social science students.

4.4 Associations with learning profiles and experiences of learning generic skills

A relationship between learning profiles and experiences of learning generic skills was found. Table 4 shows the results of the profile comparisons. Students in the deep-organized profile had the highest scores on both learning critical thinking and collaboration and communication compared to the students in the other two profiles. In contrast, the students in the unreflective profile experienced the learning of critical thinking and collaboration and communication lowest at the end of the first study year. All differences in means between the profiles were statistically significant.

5 Discussion and conclusions

The present study revealed, by using the LPA, that three expected learning profiles were identified with significant differences in the experiences of learning critical thinking, collaboration and communication among first-year law and social science students. Next, the main results are discussed in more detail.

The results of this study supported the findings of previous research in revealing unreflective, dissonant and deep-organized profiles. Three profile solutions have been identified in recent research by using cluster analysis (Mendoza et al., 2022; Tuononen et al., 2022b). In accordance with the present results, previous studies have detected a dissonant profile (i.e., students who score either low, average or high on all dimensions of approaches to learning; see for instance Vanthournout et al., 2013; Parpala et al., 2021). However, it

was somewhat surprising that an unreflective profile was found in our study. One explanation might be that the participants of our study were first-year students. In line with our findings, Asikainen et al. (2020) and Haarala-Muhonen et al. (2017) have reported an unreflective profile among first-year students. In contrast, the unreflective approach profile has not been identified in recent research conducted among social sciences and law students who are already advanced in their studies (Parpala et al., 2021; Tuononen et al., 2022b).

The results of the present study showed that the unreflective profile was the smallest profile, and students applying a deep and organized approach represented the second largest profile. In contrast to previous studies (Haarala-Muhonen et al., 2017; Parpala et al., 2021), the dissonant profile was the largest. This finding may also reflect the nature of the student population: the participants were first-year students whose adaptation to university studies may still be in progress. In the future, elaborating changes in learning profiles across disciplines using latent transition analysis (LTA) would deepen our understanding of the development of approaches to learning and its relations to adjustment and adaptation to higher education.

The second research question concerned disciplinary variation in learning profiles. The results imply that membership in the unreflective learning and dissonant profiles was more typical among law than social science students. This outcome is contrary to that of Parpala et al. (2021) who found later-stage law students most likely belonged in the deep-organized profile (see also Haarala-Muhonen et al., 2017). Prior research has also shown that social science students most typically represented a deep approach to learning and organized studying (e.g., Parpala et al., 2010, 2021; Lonka et al., 2021).

The results showed that the approaches to learning, experiences of learning critical thinking, collaboration and communication skills are significantly associated with one another at the end of the first study year. More precisely, a deep approach and organized studying

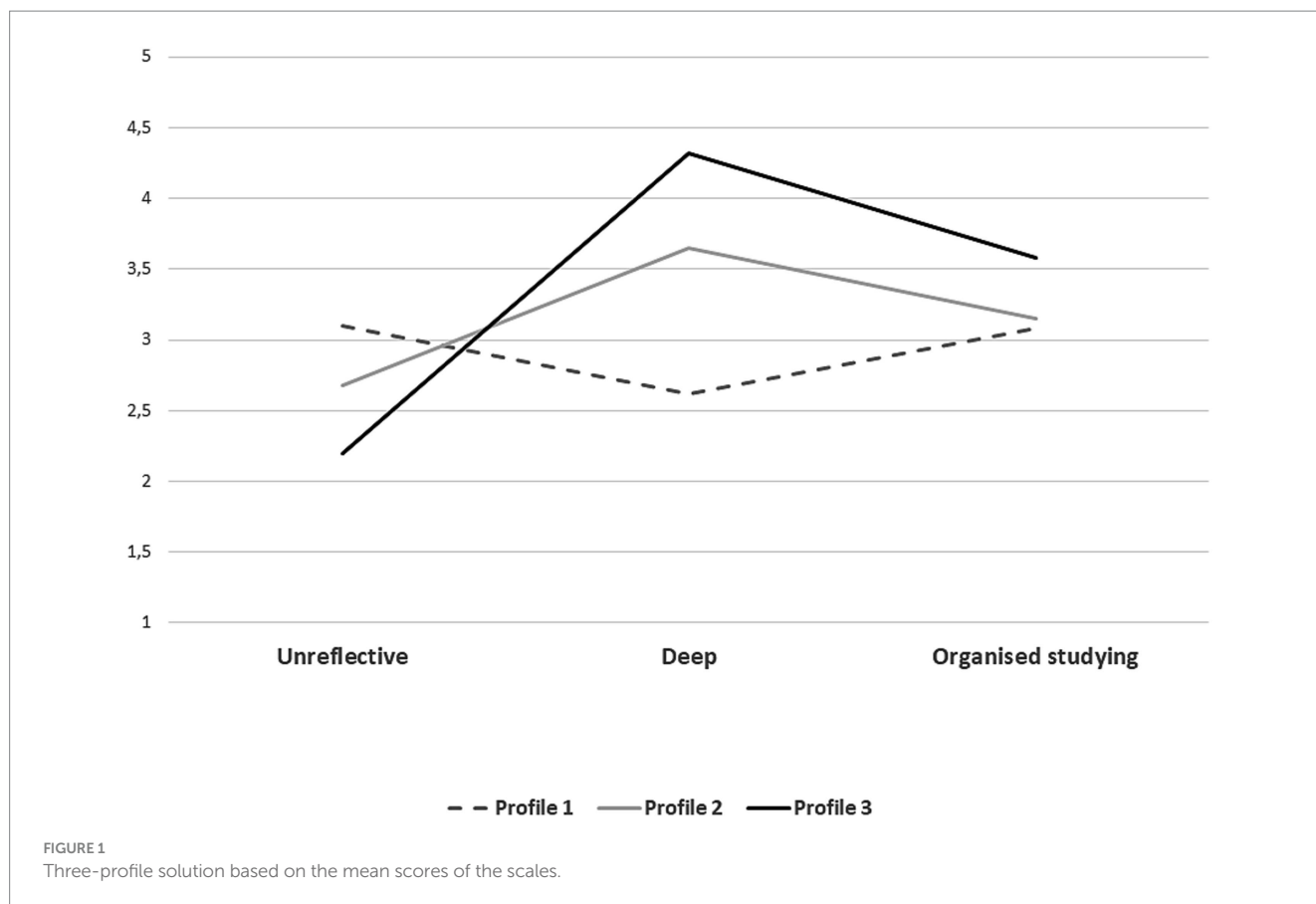


TABLE 3 Odds ratios of disciplines between the learning profiles (deep-organized profile as the reference profile).

	Deep-organized N = 316	Dissonant N = 525	Unreflective N = 60
Discipline (1 = Social Science, 2 = Law)	1.000	4.063a	5.016a

All categorical variables are dummy-coded. Odds ratios within a row sharing the same subscripts are not significantly different at the $p < 0.000$ level.

were positively related to these skills, whereas an unreflective approach was negatively related. This is in line with the previous studies which have found a relationship between deep approach and generic skills (Kreber, 2003; Nelson Laird et al., 2014; Sharp et al., 2017; Tuononen et al., 2019a). In addition, it appeared that the experiences of learning critical thinking, collaboration and communication varied according to the learning profiles. The students who belonged to the deep-organized profile scored highest on all measured generic skills compared to the other two profiles. Additionally, the scores on learning critical thinking as well as collaboration and communication were the lowest in the unreflective profile. However, it should be noted that the experiences of collaboration and communication skills were the lowest in all learning profiles, with the lowest scores being in the unreflective approach. Thus, it seems that it is challenging for a student to reflect on their learning of critical thinking, collaboration and communication skills as well if there are challenges in learning, i.e., difficulties in relating fragmented ideas and understanding the contents as a whole (Tuononen et al., 2017). To sum up, the way that the deep approach to learning is linked to organized studying seems to be an important factor in explaining how the learning of critical

thinking, collaboration and communication skills are experienced. However, further research is needed to better understand the reasons behind disciplinary variation in learning profiles (see also Parpala et al., 2021).

5.1 Methodological reflections

Although the internal structure of the instrument appeared to be reasonable, there are several limitations to this study that should be taken into account. First, less than a half of the cohorts from the two disciplines volunteered to participate in this study. It is therefore important to note that the experiences of those who did not participate remain unknown. Furthermore, the results cannot be generalized to students in other fields of study. Second, this study focuses on only three key generic skills using solely two scales. Consequently, the results cannot be applied to all generic skills. In the future, it would be important to explore broader sets of generic skills and their connections to the dimensions of approaches to learning. Additionally, the factor solution of the generic skills questionnaire reported here partly differed from the findings of a

TABLE 4 Means of learning generic skills variables between learning profiles.

Variable	Deep-organized N = 316	Dissonant N = 525	Unreflective N = 60
Critical thinking	4.097	3.517	2.893
Communication and collaboration	3.621	3.212	2.641

All means within a given row are statistically different ($p < 0.001$).

recent study conducted in the field of medicine (Räisänen et al., 2022). Therefore, it would be important to explore further the internal structure of the generic skills questionnaire in various disciplines. A third limitation is that the data used in this study is based entirely on students' self-reports. The self-reported measures can always be subject to overestimation or underestimation and can be affected by students' inability to reflect. Moreover, the self-reports relating to the learning of critical thinking, collaboration and communication should not be interpreted as actual levels of mastery of these skills, nor of the students' abilities to apply these skills in authentic situations (see Braun and Mishra, 2016). The self-reports merely reveal students' personal experiences and perceptions of their learning of generic skills. However, such knowledge is valuable because it enables students to recognize and reflect on their learning (Kyndt et al., 2014). Nevertheless, performance-based research on students' mastery of different generic skills and its relations to the dimensions of approaches to learning is needed in the future (see Hyttinen et al., 2018; Tuononen et al., 2022a).

5.2 Practical implications

Based on our findings, we present some practical implications. First, since learning profiles and experiences of learning generic skills are associated with each other, it is important to help the students to develop a deep and organized approach from the very beginning of studies. This is particularly important in disciplines where first-year students often participate in content-driven lecture courses. In addition, special attention needs to be paid as to how generic skills are taught. If teaching focuses on bits and pieces without the intention of comprehending the bigger picture of the content, there will be no opportunities to develop deep approaches to learning or critical thinking skills (cf. Star and Hammer, 2008; Hyttinen et al., 2018, 2019). Learning generic skills in higher education is possible with some effort (Arum and Roksa, 2011; Tuononen et al., 2017). In addition, carefully selected pedagogical practices are called for that emphasize students' activity and collaboration (Virtanen and Tynjälä, 2019). Therefore, it is essential that teachers have the adequate pedagogical competence to support the students' deep approaches to learning, organized studying and various generic skills. Secondly, the results indicate that scores in all learning profiles on the learning of collaboration and communication skills were lower than those of learning critical thinking skills. We know from previous studies that these skills are usually assessed as being learned less at university (Andrews and Higson, 2008; Tuononen et al., 2019a), and so it follows that the development of collaboration and communication should be better addressed in courses throughout the degree programs in Law and Social Science.

5.3 Conclusion

In this study, by using the person-oriented approach, individual and disciplinary variation was identified in the way first-year students combine their approaches to learning, and this variation was related to the ways in which the learning of critical thinking, collaboration and communication were experienced during the first year of study. In the future, longitudinal follow-up studies could focus on exploring how students' learning profiles and various generic skills develop over time in different disciplines in higher education. Additionally, more research is needed how teaching practices influence learning generic skills in different disciplines. Moreover, further research could explore the kinds of pedagogical practices that would support the development of a deep-organized approach and promote the learning of different generic skills.

Data availability statement

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

Ethics statement

Ethical approval was not required for the studies involving humans because participation was voluntary and informed consent was obtained. This study did not involve participants under the age of 15. Furthermore, it did not cause any exposure to strong stimuli, which could have caused long-term mental harm. Following these principles of the Finnish National Board on Research Integrity (2019), this study did not require separate ethical review or approval in Finland. The responses of those students who gave permission were used in the present study. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

HH: Conceptualization, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. TT: Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing. AH-M: Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2023.1330898/full#supplementary-material>

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