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Debunking the myth of high achievers in Finnish primary teacher education: first-year preservice teachers' learning strategies and study success

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ABSTRACT

This study aimed to explore the admitted students of Finnish primary teacher education programmes from the viewpoint of learning strategies, and academic success. An overall view was derived from national register data, which were supplemented with questionnaire data gathered from three teacher education units (N = 216). Primary teacher programmes currently seem to attract and select mediocre secondary school graduates from academic perspective, contrary to previous studies. Furthermore, women enter the programmes with higher exam scores than men and have more success in their studies. Based on their learning strategies, students were divided into subgroups of deep and independent learners, and reproductive and support-dependent learners. Previous study success was positively associated with first-year study success. It is important for teacher educators to acknowledge that the students are rather mediocre in the academic sense, even reproductive and lacking regulation skills, and thus might need support in developing into professional learners.

Introduction

The current study examines what kind of students are selected in Finnish primary teacher education programmes in terms of their previous study success and study strategies. Thus, the study aims at testing whether the wide spread myth of high-achieving students in Finnish primary teacher education still holds true (e.g. Malinen, Väisänen, and Savolainen 2012; OECD 2015). Furthermore, the aforementioned factors are contrasted with the students' first-year study success in the programmes. We assume that by mapping and describing the current student material, implications for the development of teacher education programmes and student admission can be made. We consider it important to raise the awareness of teacher educators concerning the types of students that are admitted to primary teacher education.

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Undoubtedly, students with the highest facility for teaching should be selected for teacher education programmes (Klassen et al. 2018). Therefore, it is crucial to investigate students' learning strategies, since these are of great importance not only during university studies but also later in working life, where teachers are concerned with learning-related issues on a daily basis. Consequently, the study produces valuable information for teacher educators on the learning strategies of their students and for successful student admission, which is one of the key strategic guidelines indicated by the Development Programme for Teachers Pre-, Introductory and In-service Education of the Finnish Teacher Education Forum (Ministry of Education and Culture (MEC) 2016a; Lavonen et al. 2020).

The goal of all teacher education is to equip graduates with the knowledge and core transferable skills they need to succeed in their future occupation. In Finland, teachers work independently as experts and feel trusted and appreciated as professionals (Mikkilä-Erdmann, Warinowski, and Iiskala 2019). They enjoy significant pedagogical freedom within the limits of the curriculum, substantial professional autonomy and considerable responsibility (e.g. Tirri 2014; Toom and Husu 2016). In Finnish teacher education programmes, theory and practice overlap, promoting a research-oriented attitude and expertise in which teachers are willing to learn and develop themselves (Darling-Hammond 2017; Mikkilä-Erdmann, Warinowski, and Iiskala 2019). Research orientation, which is not an obvious feature of teacher education, has been assumed to contribute to readiness for continuous learning (Lavonen et al. 2020).

However, for these qualities to develop, preservice teachers need to be able to steer and regulate their learning. As self-regulation is one of the central components of expertise (e.g. Tynjälä et al. 2016), students have to develop these skills during their studies to become expert teachers instead of merely experienced non-expert teachers (Kreber et al. 2005). Since teachers also act as role models of learning for their pupils, it is essential that they learn to regulate their own learning during teacher education (Endedijk et al. 2012; Kramarski and Michalsky 2009). For instance, they need to be able to integrate knowledge gained from teaching experiences at practice schools and university courses, self-evaluate their competencies and identify their learning needs (Endedijk et al. 2012).

Despite the noble ambitions of teacher education institutions to educate self-regulated and independent professionals, these goals are not automatically realised. One of the challenges identified in Finnish education is related to teachers' innovative orientation and a lack of willingness and competence for personal professional learning (Lavonen et al. 2020). Thus, supporting students' learning strategies towards professional learning at the beginning of their studies is important. When entering university education, students' learning practices need adjustment and adaptation to this new higher education teaching and learning environment. The students might even face a 'learning shock' when starting their studies in the university setting (Christie et al. 2008). It seems that the success of the transition depends largely on the students' ability to become independent learners: those who understand what independent learning requires and have good time management skills adapt the best (Christie, Barron, and D'Annunzio-Green 2013). In particular, the first year at the university seems to be challenging, and it plays an important role in students' academic performance and achievement (Jenert et al. 2015).

The role of learning strategies in successful studying and learning

One approach to explaining the variation in students' learning can be derived from the Students' Approaches to Learning (SAL) tradition, and more specifically from the learning pattern model as a frequently used representative of this tradition (Vanthournout et al. 2014; Vermunt 1998). Leaning on this framework, we focus on learning strategies, seen as the combination of processing and regulation strategies. Cognitive processing strategies refer to all the thinking activities students use to process learning content and attain their learning goals, whereas metacognitive regulation activities are used to regulate and steer the learning processes. Learning strategies are not unchangeable personal attributes, but rather affected by several personal and contextual factors, including age and educational experience, as well as the teaching methods and the type of assessment, and the opportunities to collaborate (Vermunt and Donche 2017). Thus, it is important to study with what kind of learning strategies students enter to primary teacher education, and what kind of learning strategies primary teacher education programmes promote.

It is widely accepted that deep, meaning-directed learning leads to better learning outcomes. According to the learning pattern model, meaningful learning can be attained when the subject matter is processed deeply (Vermunt and Donche 2017). *Deep processing* includes ideas of relating parts of the subject matter to each other and existing knowledge, forming a coherent whole. Additionally, deep processing includes taking a critical stand towards the learning content in that students form their own opinions and conclusions about the subject and mirror these against the conclusions presented by the textbook authors or teachers (Vermunt et al. 2014). As an opposing strategy, the model presents *stepwise processing*, which incorporates the idea that the subject matter is studied in detail, analytically and is often learned by heart. Thus, stepwise processing is characterised by memorising, rehearsing and analysing. The third strategy in the model is called *concrete processing*, which refers to dealing with the subject matter in a concrete and application-directed way.

The learning pattern model distinguishes three metacognitive regulation strategies (Vermunt and Donche 2017). In higher education settings, *self-regulation* seems to be the most appropriate regulation strategy since external support is very limited (Vermunt and Verloop 1999). According to the model, learning is self-regulated when the students themselves guide their learning processes, for example, by planning their studies, monitoring their progress and evaluating their learning outcomes. In reality, learning is not often fully self-regulated; rather, the regulation tasks are divided between the student and the teacher to some extent (Vermunt and Verloop 1999). When the responsibility for learning is given to the teacher, one might speak about *external regulation*. In this strategy, it is the teacher who plans, sets goals and evaluates the learning, and the students let themselves be directed by the regulation sources provided in instruction (e.g. learning objectives, assignments, tasks, tests, etc.). The third strategy, *lack of regulation*, refers to a situation in which neither the student nor the teacher regulates the learning process (Vermunt 1998; Vermunt and Donche 2017). Students with a lack of regulation often acknowledge that they have problems in learning but do not know how to do it differently. They also have difficulties evaluating whether they have mastered certain content. Lack of regulation is typically expressed by students who are in transition from one form of schooling to another, for example from secondary to higher education, and trying to adapt to the new environment (Vermunt and Donche 2017).

Learning strategies have been found to be related to academic achievement (e.g. Donche et al. 2014; Vermunt 2005; Vermunt and Donche 2017). Deep learning seems to be positively associated with academic success, while lack of regulation is consistently and negatively related to academic performance. In a rapidly changing society, the memorisation of facts and procedures is not enough, but skills such as problem solving, critical thinking and self-regulation are needed for progress and success and form the basis of all studying and working (Council of the European Union 2018). Therefore, learning strategies of deep processing and self-regulation seem to be crucial features of learning at university and later in working life.

Context of the study: primary teacher education in Finland

Primary school teachers in Finland work in grades 1–6 and have pupils between 7 and 12 years of age. Primary teacher education is provided in eight research-intensive universities located throughout the country, covering all geographical regions from north to south and from east to west. Primary teacher education was transferred to universities in the 1970s, and elevated to a master's level degree at the end of the same decade. The primary teacher programme involves a total of 300 credits, typically including educational sciences as a major. The structure of the teacher education programme is legislated. Primary teacher programmes must include at least 60 credits of multidisciplinary studies on school subjects, such as mother tongue, mathematics, arts and crafts, etc., and at least 60 credit points of teachers' pedagogical studies (Teaching Qualifications Decree 986/ 1998, 4 §). Education as a major involves study modules on educational sciences, such as educational psychology, philosophy, sociology, didactics and research methodology. Teaching practice periods, included in the pedagogical studies, are conducted mainly in the teacher training schools (i.e. so-called 'normal schools'), where preservice teachers are tutored by training school teachers. The first year of the degree typically includes basic studies of the major subject education (25 credits), orienting teaching practice and introduction to research-oriented thinking.

While many countries struggle to find ways to attract young people to apply for teacher training, professions in the field of education have long been highly competitive in Finland (OECD 2020a). For example, in primary teacher education, only 11% of applicants were admitted into primary teacher programmes during the 2010s (University of Helsinki 2020). While the number of applicants is no longer at the level of the peak years (2013–2014), there have still been approximately seven times more applicants than available degree places in primary teacher programmes in recent years. Thus, it is clear that many of those not selected repeatedly apply for teacher training year after year.

The difficulty of being chosen for this desired degree programme makes the teacher's profession look elusive, but it has also led to the perception that admission into primary teacher programmes requires excellent grades in upper secondary school. This conception has been spread in international comparisons (e.g. OECD 2015) stating that Finnish teacher education institutions can recruit the best high school graduates (p. 2). In addition, Finnish scholars have expressed that Finnish primary teacher education typically attracts applicants with excellent secondary-school diplomas (Malinen, Väisänen, and Savolainen 2012).

The primary teacher programmes aim to meet the challenge of student selection through a two-stage process. In 2019, the first stage was a national written multiple-choice exam assessing candidates' academic study skills, pedagogical thinking and ability to apply knowledge of educational sciences. The best applicants in the first stage were invited to the second stage, which was a locally arranged interview-based aptitude test to assess suitability for the teaching profession. The aptitude test has been considered one of the core features of Finnish primary teacher education and is essential in assessing communication, interpersonal and leadership skills, attitude and aspirational commitment to the profession (Mankki, Mäkinen, and Räihä 2019).

In 2016, the Teacher Education Forum's development programme (MEC 2016a) emphasised that the aptitude of candidates ought to be assessed in student selections for teacher education. Nevertheless, the admission methods used in Finnish higher education have been criticised for lacking evidence concerning reliability, validity and their potential to predict future job performance (MEC 2016b). The research has also pointed out problems concerning the selection criteria, unbiased assessment and predictive validity in primary teacher selection, especially in the aptitude test (Mankki, Mäkinen, and Räihä 2019). Therefore, the Teacher Education Forum instructed student admissions into teacher education to be developed in cooperation with members of the forum, educational experts, students and teachers (Ministry of Education and Culture (MEC) 2016a).

The following year, the Teacher Education Forum granted funding for a project called *Student Selection to Teacher Education in Finland – Anticipatory Work for Future* (OVET project) to advance and improve the student selection process for teacher education in Finland. Based on the cooperative work among participating universities during the project, teacher education programmes have set up a genuine joint selection system in which applicants can apply to several teacher education departments and programmes with the same aptitude test. This means that, since 2020, the aptitude test has been, for the first time, arranged in a similar manner in teacher education programmes across the country. In addition, the first phase was changed at the beginning of the current decade, based on national recommendations, to give matriculation exams more weight in the higher education student selection process. Therefore, from 2020 onwards, 60% of the places in the aptitude test have been filled based on the applicants' grades on the matriculation exam.

The aim of the study

As illustrated earlier, the selections for primary teacher programmes are demanding, and only a small percentage of applicants are admitted to study. However, we do not have much information about what kind of students the selected applicants are, although the perception of high-achieving girls seems to persist. To inform future selections and teacher educators, we aimed to study the admitted students' previous study success and learning strategies, as well as their relations to first-year study success. An overall view was derived from national register data (Vipunen 2020), which were supplemented with a closer look on questionnaire data gathered from three teacher education units. The research questions were the following:

(1) Based on descriptive register data on matriculation exam performance, what kind of students are selected to primary teacher education nationally?

(2) Based on the sample of three teacher education units, what kind of students are selected to primary teacher education in terms of previous study success and learning strategies, and how they succeed in their first study year?

Comparisons between units and in terms of gender are also made.

Materials and methods

Participants

The participants of the questionnaire study were first-year preservice teachers ($N = 216$) who were admitted into the primary teacher education programme in July 2019 and started their studies in the following autumn. The sample represents a rich quarter of all the admitted students into primary teacher education programmes in Finland at the time of study. The participants studied in three different teacher education units, thus representing almost half of the units. The selected units were in three cities with diverse geographical locations: Unit 1 ($n = 81$) and Unit 3 ($n = 60$) were situated in big cities, whereas Unit 2 was in a small city ($n = 72$). The majority of the participants, 78%, were women, which is a typical proportion of women in Finnish primary teacher education and among Finnish primary teachers (OECD 2020b). The division of male and female students in each unit was similar.

Materials and data collection

General data about the matriculation exam scores of applied and selected university students were extracted from the national education administration's reporting portal, Vipunen (2020), maintained by the Ministry of Education and Culture and the Finnish National Agency for Education. In Finland, the matriculation examination is completed when general upper secondary student has passed at least four exams in baccalaureate at the end of the studies, which normatively last for three years. The typical route to universities is via upper secondary schools, where the training is more guided and structured compared to university studies.

The questionnaire data was collected during Autumn 2019 (i.e. the students' first study semester in the primary teacher programme). The questionnaire comprised background questions and Likert-scale items concerning their text processing and regulation of learning, adopted and adapted from the Inventory of Learning Styles (Vermunt 1994, 1998). Some minor changes were made to the wording of the original scales based on feedback given by student teachers in a small pilot sample. Furthermore, some items from the original scales were omitted because they were considered to fit poorly in the Finnish teacher education context. The version used in the current study included 19 items concerning processing strategies and 25 items concerning regulation strategies, while the original number of items was 27 and 28, respectively (cf. Vermunt 1994). Also, a scale of agreement (1 = completely disagree, ..., 5 = completely agree) was used instead of the original time scale (1 = seldom or never, ..., 5 = always). The purpose of the changes was to improve the cultural appropriateness of the instrument and make it relevant to Finnish teacher education. Shorter and adapted versions of the ILS have been used in other studies (e.g. Vincent and Van Petegem 2008; Vilppu, Mikkilä-Erdmann, and Ahopelto 2013; Vilppu et al. 2019; Zeegers 2004).

Participation in the study was voluntary, and informed consent was required from the participants. The study did not involve intervention in the physical integrity of the participants, deviation from informed consent, studying children under the age of 15 without parental consent, exposure to exceptionally strong stimuli, causing long-term mental harm beyond the risks of daily life, or risking participants' security (cf. Finnish Advisory Board on Research Integrity 2019). Consequently, this study did not require a Finnish ethics review. Participants were able to complete the questionnaire either on paper or in electronic form (using Microsoft Forms). The data collection procedure was similar in each university. First, information about the study and instructions about the questionnaire were given, after which participants could ask questions, decide whether they wanted to participate and then fill in the questionnaire. In Units 1 and 2, the data were gathered in selected lectures that were common for the whole first class. Those who were absent at the time of the data collection were sent a link to the questionnaire afterwards. In Unit 3, the gathering was arranged during the personal study plan group meetings, in which students received support from their supervising teacher educator.

The student register of each university was used to collect the selection and study data. The data contained information on the students' matriculation exam grades, entrance examination scores from the national written entrance exam as well as an average study grade and number of completed study credits of the first year. The latter two variables were used to measure current study success, whereas the mean grade of the matriculation examination and the scores on the written entrance exam were considered to indicate previous study success. The aptitude test scores were not taken into account as indicators of previous study success, as the test was different in each unit and thus lacked commensurability. The matriculation exam grades were converted to a numeric value that conformed to the general manner used in the reporting portal, Vipunen (2020) (from best to worst): laudatur (L) = 7, eximia cum laude approbator (E) = 6, magna cum laude approbatur (M) = 5, cum laude approbatur (C) = 4, lubenter approbatur (B) = 3, approbatur (A) = 2, improbatur (I) = 0.

Data analysis

Principal component analyses (PCA) with Varimax rotation were administered to the Likert scale items of ILS processing and regulation strategies. The PCA was first administered to the 19 items measuring processing strategies (KMO.75, Bartlett χ^2[78] = 521.95, $p < .001$), resulting in a two-component solution, in which the components explained 18.87–24.31% of the variance, the total variance explained being 43.18%. The resulting components were named *deep processing* and *stepwise processing* (see Table 1). Six items had to be omitted from the solution because of poor communalities or missing loadings.

In the original ILS (Vermunt 1994), a clear separate dimension for concrete processing is reported (e.g. Vermunt 1998). In our data, a separate dimension was not found, but two of the originally concrete processing items (Q31, Q11), were included in the deep processing scale due to strong loadings. This seemed reasonable, since both items refer to applying what has been learned, not just rigid memorisation or repetition of the content (cf. stepwise processing).

Next, PCAs were administered to the 25 items measuring the regulation of learning (KMO .75, Bartlett χ^2[171] = 865.07, $p < .001$). Three clear and theoretically sound dimensions were revealed in the analysis; each represented distinctive regulation strategies,

Table 1. Rotated component matrix of the PCA solution for processing strategy items (adapted from Vermunt 1994, 1998).

	Component	
	1 $\alpha = .77$	2 $\alpha = .69$
Q24. I try to construct an overall picture of a course for myself.	.736	
Q10. I try to see the connection between the topics discussed in different chapters of a textbook.	.724	
Q2. I try to combine the subjects that are dealt with separately in a course into one whole.	.703	
Q44. I relate specific facts to the main issue in a chapter or article.	.561	
Q15. I compare the conclusions drawn in different chapters.	.547	
Q25. I compare my view of a course topic with the views of the authors of the textbook used in that course.	.543	
Q31. I use what I learn from a course in my activities outside my studies.	.533	
Q11. When I am studying a topic, I think of cases I know from my own experience that are connected to that topic.	.520	−.309
Q39. I repeat the main parts of the subject matter until I know them by heart.		.791
Q30. I make a list of the most important facts and learn them by heart.		.745
Q3. I memorise lists of characteristics of a certain phenomenon.		.724
Q40. I work through a textbook item by item and I study each part separately.		.548
Q33. I analyse the separate components of a theory step by step.		.394

Factor loadings under 0.3 are omitted from the Table 1. Components: 1 = Deep processing, 2 = Stepwise processing.

including self-regulation, external regulation and lack of regulation. Each of the components explained 13.27–18.10% of the variance, the total variance explained being 44.68%. Also in this solution, six items had to be omitted due to either missing loadings or poor communalities. Based on the PCAs, five sum scales were formed, with satisfactory Cronbach's alpha values (> 0.60) (Table 2).

In the original ILS (Vermunt 1994), the item Q5 would have been included in the external regulation scale, but due to stronger loading, we included it with a reversed scale to the sum variable of self-regulation. By reversing the scale, the meaning resembles the other items included in the scale (cf. e.g. Q27). Reversed scales were also used for the items Q19 and Q7, which were included in external regulation scale in our data due to higher loadings, while in the original ILS (Vermunt 1994) they belong to scale of self-regulation. However, reversing the scales made the items theoretically compatible with other items in the external regulation scale.

K-means clustering with standardised values as variables was used to find different student groups in terms of processing and regulation strategies among the participants. K-means clustering was chosen since it searches for different clusters of the greatest possible distinction (Jain, Murty, and Flynn 1999). Furthermore, independent samples t-tests, one-way analyses of variance (ANOVA) and cross tabulations with Chi Square tests were administered to answer the research questions.

Results

National overview of matriculation exam performance of preservice teachers in primary teacher education

First, we present an overview of the matriculation exam performance of preservice teachers in primary teacher education based on the data of the education administration's reporting portal, Vipunen (2020), provided by the Ministry of Education and Culture and the Finnish National Agency for Education. The average grade on the matriculation

Table 2. Rotated component matrix of the PCA solution for regulation strategy items (adapted from Vermunt 1994, 1998).

	Component		
	1 α = .79	2 α = .64	3 α = .72
Q28. To test my learning progress, I try to answer questions about the subject matter which I make up myself.	.808		
Q34. To test my learning when I have studied a text book, I try to formulate the main points in my own words.	.752		
Q9. To test my own learning, I try to describe the content of a chapter in my own words.	.746		
Q5. I test my learning solely by completing the tasks provided in the course. *(reversed)*	−.597		
Q1. If I do not understand a study text well, I try to find other literature about the subject concerned.	.517		
Q27. I do more than I am expected to do in a course.	.506	−.336	
Q37. To test whether I have mastered the subject matter, I try to think up other examples besides the ones given in the study material or at the lecture.	.501	−.423	
Q22. When I start reading a new chapter or a complex of issues, I first think about the best way to study it.	.423		
Q14. If I am able to complete all the assignments given in the study materials or by the teacher, I decide that I have a good command of the subject matter.		.640	
Q29. I learn everything exactly as I find it in the textbooks.		.637	
Q20. I study all the subject matter in the same way.		.616	
Q19. I add something to the subject matter from other sources. *(reversed)*	.317	−.563	
Q7. In addition to the syllabus, I study other literature related to the content of the course. *(reversed)*	.311	−.536	
Q26. If I am able to give a good answer to the questions posed in the textbook or by the teacher, I decide that I have a good command of the subject matter.		.456	
Q18. The objectives of the course are too general for me to offer any support.			.734
Q35. I have trouble processing a large amount of subject matter.			.714
Q8. I need guidance and clear goals to support my studying.			.679
Q13. I miss someone, for example a tutor, to fall back on in case of difficulties with my studying.			.669
Q4. It is difficult for me to determine whether I master the subject matter sufficiently.			.537

Factor loadings under 0.3 are omitted from the Table 2. Components: 1 = Self-regulation, 2 = External regulation, 3 = Lack of regulation.

exam for all university students varied between 4.95 and 5.01 in 2016–2019. In other words, the average was approximately on the level of *magna cum laude approbatur (M)*. In all primary teacher education programmes, the average grade of the admitted students ranged between 4.40–4.59, meaning that the average grade was rather accurately in the middle of grades *magna cum laude approbatur (M)* and *cum laude approbatur (C)*. Therefore, the average matriculation exam performance of admitted primary teacher students was approximately half a grade lower than the average matriculation exam grade of all admitted university students. The difference in the average matriculation exam grade among all university applicants and primary teacher applicants was similar to that of admitted students. The average matriculation exam grades of admitted students and applicants in universities, primary teacher education and various teacher education programmes are reported in Table 3.

In the period considered, the university average in matriculation exam grades among the admitted students was exceeded only once by a single primary teacher programme (Tampere University in 2016). Otherwise, primary teacher programmes constantly lagged behind the average university matriculation exam grades among admitted students. One interesting detail is that the students admitted into primary teacher programmes had matriculation examination diplomas that were roughly

Table 3. Average matriculation exam grades of applicants and admitted students in universities, primary teacher education and various primary teacher programmes (Vipunen 2020).

	Universities total	Primary teacher education	Tampere Uni.	Uni. Helsinki	Uni. Jyväskylä	Uni. Turku	Uni. Oulu	Uni. Eastern Finland	Åbo Akademi Uni.	Uni. Lapland
Admitted students										
2016	4.95	4.59	4.98	4.88	4.63	4.62	4.55	4.55	4.30	4.23
2017	5.00	4.49	4.87	4.88	4.63	4.60	4.55	4.32	3.98	4.03
2018	5.03	4.49	4.89	4.67	4.78	4.54	4.43	4.27	4.23	4.19
2019	5.01	4.40	4.66	4.61	4.50	4.51	4.38	4.28	4.18	4.03
Applicants										
2016	4.48	4.15	4.22	4.25	4.19	4.14	4.09	4.08	4.09	3.91
2017	4.49	4.14	4.19	4.27	4.23	4.10	4.10	4.03	4.00	3.89
2018	4.49	4.12	4.17	4.19	4.16	4.08	4.08	4.03	4.07	3.91
2019	4.48	4.08	4.13	4.11	4.07	4.03	4.06	3.98	4.17	3.91

equal to those of average university applicants. The trend in matriculation examination certificate grade averages is also descendent in students admitted into primary teacher education. The cohort of admitted students in primary teacher programmes in 2019 had, virtually without exception, a lower grade average than previous cohorts. In the same period, the average grade of the admitted university students was slightly higher.

When the differences were compared between genders in the matriculation exam grades among the admitted university and primary teacher education students and applicants, the statistics show that admitted male primary teacher students and male applicants for primary teacher education had lower matriculation grade averages than their female counterparts (Table 4). The annual differences varied between .36–.47 among the admitted primary teacher students and between .34–.38 among the primary teacher applicants. In addition, a descending trend is visible in both genders, especially among the admitted primary education students. When comparing the situation to the gender-based differences in matriculation exam averages among all admitted university and all university applicants, the difference between men and women is smaller than in primary teacher education – between .09–.20 among admitted students and between .19–.26 among the applicants.

Table 4. Average matriculation exam grades for male and female applicants and admitted students in universities and primary teacher education programmes (Vipunen 2020).

	Admitted Students				Applicants			
	Universities		Primary teacher education		Universities		Primary teacher education	
	Men	Women	Men	Women	Men	Women	Men	Women
2016	4.84	5.04	4.30	4.67	4.33	4.59	3.87	4.25
2017	4.90	5.07	4.13	4.60	4.36	4.59	3.89	4.23
2018	4.94	5.09	4.21	4.57	4.36	4.58	3.86	4.21
2019	4.96	5.05	4.09	4.48	4.36	4.55	3.82	4.16

First-year preservice teachers in three teacher education units

Previous study success

In terms of matriculation exam grade average, the three teacher education units did not show statistically significant differences from each other, although there were slight differences between the units (Unit 3: $M = 4.67$, $SD = .56$; Unit 1: $M = 4.57$, SD = .86; Unit 2: $M = 4.40$, $SD = .87$). However, we found statistically significant differences between the units in the written entrance exam ($F(2) = 28.45$, $p < .01$), which are probably due to the different number of applicants. According to the Tukey HSD and Bonferroni post hoc tests, Unit 2 ($M = 82.18$, $SD = 11.77$) differed from the other two units (Unit 1: $M = 96.41$, $SD = 12.38$; Unit 3: $M = 100.27$, $SD = 12.79$, $p < .001$). In the more popular units, higher scores on the written exam were, understandably, required to be accepted in the second phase.

Following the national trend, selected female students ($M = 4.69$, $SD = .75$) outperformed males ($M = 4.10$, $SD = .64$) on the matriculation exam ($t(152) = -4.32$, $p < .001$), and the same difference for women was found in the written entrance exam ($t(160) = -2.07$, $p < .05$).

Learning strategies

To reveal subgroups of students, K-means clustering with standardised values of the sum scales as variables was utilised to classify students according to their responses to items concerning processing and regulation strategies. Based on theoretical expectations, a two-cluster model was applied (see Figure 1). According to *ANOVA* results, the division into two groups was reasonable ($p < .000–.003$) (Table 5).

The groups showed statistically significant differences in terms of all clustering variables, with effect sizes (r) ranging from .24 to −.69 (from medium to large). The biggest differences between the clusters emerged in the deep processing, external regulation and self-regulation scales. The first group represented *reproductive and support-dependent students* ($n = 73$, 45%), and they scored higher on stepwise processing, external regulation and lack of regulation. The second group was labelled as *deep and independent learners* ($n = 91$, 55%), since they scored higher on deep processing and self-regulation.

To study the division of subgroups of students in different teacher education units, cross-tabulations with Chi Square were used. The results show that the unit and the cluster membership were connected ($\chi^2(2) = 16.57$, p < .000). In Unit 2, the number of deep learners was smaller than that of reproductive learners, whereas in other units the situation was reversed (Figure 2).

Next, gender and previous study success were investigated with regard to the clusters. Participant gender was not connected with cluster membership ($\chi^2(1) = 1.16$, $p > .05$). Rather, men and women were quite similarly represented in the groups of reproductive and support-dependent learners (24.7% men, 75.3% women) and deep and independent learners (17.8% men, 82.2% women). When the mean of all the subjects in the matriculation exam was examined, no statistically significant difference was found between the cluster groups, although the deep and independent learners had slightly better means. However, deep and independent learners ($M = 98.27$, $SD = 14.40$) performed better than reproductive and support-dependent learners ($M = 89.26$, $SD = 12.63$) on the written entrance exam, $t(132) = -3.76$, $p < .001$.
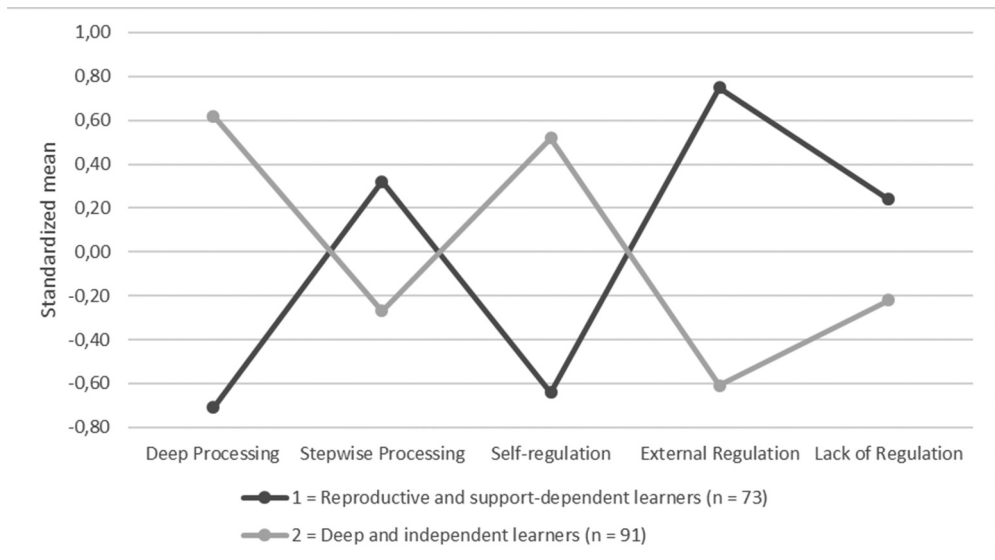
Figure 1. Standardised mean profiles of the two-cluster solution.

Table 5. Means, standard deviations, and t-test results for group differences in processing and regulation strategies.

	Reproductive and support-dependent students (n = 73)		Deep and independent learners (n = 91)					
Variable	M	SD	M	SD	t(162)	p	Cohen's d	effect size r
Deep processing	3.48	0.38	4.16	0.33	−12.03	<.001	−1.91	−0.69
Stepwise processing	3.32	0.73	2.90	0.67	3.88	<.001	0.60	0.29
Self-regulation	2.87	0.54	3.66	0.56	−8.96	<.001	−1.44	−0.58
External regulation	3.63	0.43	2.83	0.45	11.43	<.001	1.82	0.67
Lack of regulation	3.34	0.72	2.98	0.76	3.03	<.01	0.49	0.24

First-year study success

The number of credits earned and the mean grade of the completed courses were used to measure students' study success in the current primary teacher education programme during the first study year. On average, students earned 60.05 (SD = 16.73) European Credit Transfer System (ECTS) credits during the first year, and on average, their mean grade was 3.53 (SD = .72) on a scale of 1 to 5. Among the three units, a statistically significant difference was found in the mean grade of completed courses (F(2) = 129.38, p < .001), but not in the number of credits. Post hoc tests showed that the differences were significant (p < .001) among all the programmes (Unit 3: M = 4.26, SD = .34; Unit 1: M = 2.98, SD = .40; Unit 2: M = 3.34, SD = .63).

When the number of earned credits and the mean grade of courses were contrasted with the matriculation exam results and written entrance exam scores, significant correlations between the variables were found (see Table 6). The mean grade of the completed courses seemed to be positively associated with success in both the matriculation exam and the entrance exam.
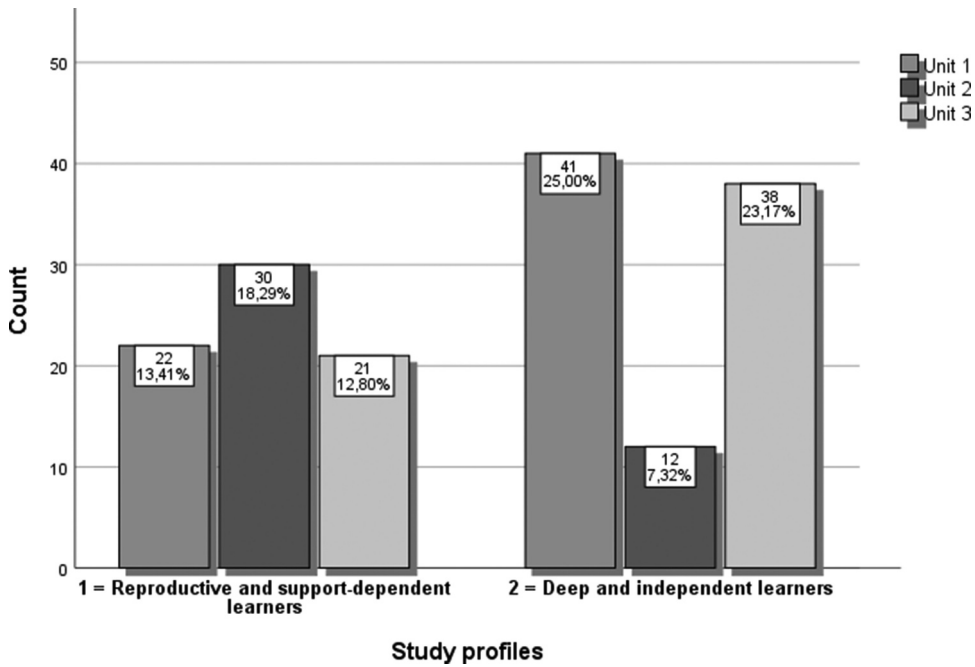
Figure 2. The division of study profile groups in the three teacher education units.

Table 6. Correlations between current study success measures, matriculation exam and entrance exam scores.

	1.	2.	3.	4.
1. Number of earned study credits	1	.170*	−.035	−.054
2. Mean grade of completed courses		1	.184*	.273**
3. Mean of all subject grades in the matriculation exam			1	.339**
4. Scores on the national written entrance exam				1

**p < .01, *p < .05.

Next, we looked at these according to the students' gender. According to the t-test results, male ($M = 60.00$, $SD = 21.23$) and female ($M = 60.08$, $SD = 15.39$) students earned study credits equally, $t(165) = −.03$, p > .05. However, female students ($M = 3.60$, $SD = .72$) outperformed males ($M = 3.32$, $SD = .70$) in the mean grade of completed courses, $t(59.26) = −2.06$, $p < .05$. The same pattern was seen in Unit 1 but not in the two other teacher education units.

Finally, the participants' study success in primary teacher education was investigated in relation to study profiles. Reproductive and support-dependent students ($M = 62.41$, $SD = 24.16$) earned slightly more study credits than deep and independent learners ($M = 59.04$, $SD = 11.91$), but the difference was not statistically significant ($t(79.03) = .99$, $p = .33$). When the mean of completed grades was compared, no statistically significant difference was found ($t(136) = −.24$, $p = .22$), although deep and independent learners ($M = 3.68$, $SD = .69$) had slightly higher grades on average than the other group ($M = 3.52$, $SD = .77$).

Discussion

In Finland, primary teacher programmes are very popular and difficult to access, as the students are admitted to the programmes based on selective two-stage entrance exams. In this study, the aim was to examine what kind of students are selected for these programmes in terms of their previous study success and study strategies. Furthermore, we looked at first-year students' study success in relation to these variables, as well as gender differences and differences between units.

Nationally, it seems that the average matriculation exam performance of admitted primary teacher students has been somewhat lower than the average of all admitted university students, which contradicts previous descriptions (e.g. Malinen, Väisänen, and Savolainen 2012; OECD 2015). The difficulty of being chosen for this desired degree programme makes the teacher's profession seem elusive, but it has also produced a misconception that admission into primary teacher programmes would require excellent grades in upper secondary school. Based on the data, it is fair to say that, currently, teacher education does not attract the best secondary school graduates, but rather, a mediocre applicant group, at least in the academic sense. Additionally, from the cross-sectional data, a descending trend is apparent in matriculation examination grade average for both genders and admitted students in general.

There are many speculations and opinions of what alienates young people from teacher education and profession, a development seen in the student admission process. For example, negative media attention concerning deteriorating working conditions has been suggested to diminish the attractiveness of the profession (Heikkinen et al. 2020). A recent study (Mankki and Kyrö-Ämmälä 2021) shed light to the process by showing that the conceptions of arduous admission, precarious profession and deterministic training are the most common reasons for turning down primary teacher education and the profession. It would be important to fight these demotives and the misconception of teacher profession as elusive to enhance the attractiveness of teacher education and the profession.

In our closer look at the three teacher education units, slight differences between them were found regarding the previous and current study success of the students. Based on the matriculation exam results, similar students were selected in each of the three programmes, although there were differences in the written entrance exam scores between units. Success in the matriculation exam and entrance exam were positively associated with first-year study success. The three units differed concerning the average grades, in that Unit 3 students had the best and Unit 1 students had the worst average grades during the first year. This might be more of an indication of different assessment cultures than of differences between students, since in Unit 3, the distribution of grades was skewed.

Nationally, men seem to enter primary teacher education (as in Finnish universities in general) with lower matriculation exam grades than women. The same pattern was illustrated in the data gathered from three teacher education units: selected female students scored better on both the matriculation exam and the written exam than their male counterparts. In contrast, a hidden quota has been discovered in the previous aptitude test (before the joint selection system), in which teacher educators seem to award better scores to male applicants (Mankki, Mäkinen, and Räihä 2019). These gender-related differences in student selections highlight the importance of awareness of gender

issues in future selection studies and the development of student selections. In Finland, primary teacher education seems to attract women; this is a common feature in the education sector, especially in the earlier years of schooling in OECD countries (OECD 2018). Women also outperformed men in their first-year study success, which coincides with a growing body of evidence showing that men perform worse than women in both teacher training and the teaching profession (see Mankki, Mäkinen, and Räihä 2019). Previous studies have shown, for example, that male students show fewer intrinsic (Struyven, Jacobs, and Dochy 2013) or child-centred (Heinz 2015) motives than their female counterparts, which might be mirrored in their performance. Further, our results might reflect the wider discussion of teaching as a female-dominated occupation. Gendered conceptions of the occupation might reduce men's willingness to become a teacher, and men often seem to perceive teaching as a second choice (Bieri Buschor et al. 2014).

Despite the selective two-phase entrance exam, primary teacher students seem to enter teacher education programmes with variable learning strategies. Among the students, two subgroups were identified: deep and independent learners, and reproductive and support-dependent students. Therefore, it seems that learning strategies were not emphasised in the student selection, although differences between the subgroups could be seen in the written entrance exam, where deep and independent students scored better. There were differences in students' learning strategies between the units, which might develop into regional challenges in coping with the training and in the future profession. Thus, it is important to ensure that during the training, all students acquire basic study skills. The study programme and the profession of a classroom teacher are challenging, for example, in terms of their multidisciplinary nature and knowledge-intensiveness (Heikkilä et al. 2020). Thus, one might argue that good learning strategies are required both during studies and later in working life. However, according to our data, the study strategy profile was not connected with the average grade of earned study credits during the first year, although deep and independent students slightly outperformed reproductive and support-dependent students. It seems that the study strategies might not play such a large role, at least in the very beginning of primary teacher studies; this is contrary to the findings of De, Mikaël, and Frenay (2014), which suggested that self-regulation is especially important for explaining study success at the beginning of university studies. Further, the role of self-regulation and autonomous learning in successful transition to university has been emphasised in other studies (Brooman and Darwent 2014; Christie, Barron, and D'Annunzio-Green 2013). Gender differences concerning the learning strategy profiles were not found, although previous research has indicated that female students engage more in surface processing (Donche et al. 2014).

Especially at the beginning of university studies, prior education and previous learning environment, which for most students is upper secondary school, might still influence students' learning strategies (Donche et al. 2014). Thus, the attention should also be focused on how secondary education prepares students for higher education environments. Students seem to benefit from environments that are not too different from those in secondary education (Coertjens et al. 2017), implicating the importance of bridge building between secondary and higher education. One might argue that unlike typical Finnish university programmes, primary teacher programmes are very school-like and inflexible; for example, they have a strict study structure and ready-made schedules. This

external regulation offered by the programme might help to sustain support-dependent strategies during the studies, or it might at least help reproductive and support-dependent students to manage in their studies. Additionally, in the initial stage of teacher education, there are a lot of group works, which may enable leaning to the support of other students, or even getting credits without much personal responsibility or effort. However, if these students keep to the externally regulated learning strategy, it might be difficult to adopt a more innovative and critical approach to studying. Thus, they need support in becoming professional learners, which should be taken into account in the curriculum.

We argue that in teacher education programmes, mastery learning goals should be required (cf. Mikkilä-Erdmann et al. 2012). Since the training is rather school-like, it should be ensured, that graduated primary school teachers have the skills to further develop their expertise in the working life. In expertise professions, the learning beyond formal education is important. In their future profession, primary teachers need to see themselves as independent and responsible experts who are able to control their knowledge base to educate citizens who are capable of creative and critical thinking (Heikkilä et al. 2020).

Limitations and future studies

Our study provides a thorough overview of preservice teachers in Finnish teacher education programmes in general, as well as at three different units in more detail. However, the study has limitations that need to be addressed in future studies. First, although the use of two complimentary data sets can be seen as a strength of the study, they could not be combined which brings some restrictions to the analyses. Second, although the questionnaire data comprised almost half (three out of eight) primary teacher education units in Finland, it may not reflect the whole picture. In the future, it would be important to gather nationwide datasets to get a global vision of the teacher education in Finland. Furthermore, our sample comprises only the data collected in the first study year, requiring a follow-up study to see how learning strategies develop during training and whether their role in explaining study success will become more crucial in the long term. Additionally, the current study gives a rather simplified view of students' success in the programmes, omitting, for example, the success of their professional behaviour in teaching practice, which is not assessed numerically. Furthermore, differences between the units (i.e. their curriculum, assessment culture and location) might have influenced the results and made the comparisons between the units somewhat complicated. One might also question whether the traditional learning models are applicable to these kinds of training, which involve diverse contexts through internships, for example (see Endedijk, Donche, and Oosterheert 2014). Thus, more specified measures of students' study success and learning strategies during the programmes should be considered in further studies. In the future, it would be interesting to combine the data from the student selection and study phases with how the teacher graduates manage in their work.

Conclusion and implications for teacher training

To summarise the results, it seems that instead of attracting applicants with the best high school diplomas (cf. Malinen, Väisänen, and Savolainen 2012; OECD 2015), rather mediocre students from academic perspective enter the primary teacher programmes. Additionally, most of the selected students are female and enter the programmes with better grades than males. Thus, while the resilient and wide spread myth of high-achieving students can be debunked, it is at the same time important to think ways of maintaining and enhancing the attractiveness of teacher education to be able to select students with the highest facility for teaching in the future as well. The misconception of teacher education as elusive should also be refuted, since students with mediocre previous study success and even with various study strategies are able to enter the most desired teacher training programmes. It is also good to bear in mind that an excellent high school diploma or effective learning strategies per se do not automatically make a good teacher. Sometimes a student with difficulties in learning might even become a better teacher than the one with excellent learning strategies, at least in the sense that the former might be better able to recognise problems and support pupils who struggle with learning. Thus, it should not be seen simply as a weakness that the programmes do not attract only the best applicants anymore, but the role of learning strategies and previous study success should be looked into in the long term.

Overall, the attractiveness of the programmes could be enhanced by stressing the lightened admission procedure due to the joint selection system and a greater emphasis on matriculation exam. In addition, more effective teaching and meaningful learning experiences should be aimed at by recognising and acknowledging students' background characteristics (Mankki and Kyrö-Ämmälä 2021). Teacher educators should be made aware of the student intake, and recognise that admitted students are not necessarily the most high-achieving in the academic sense. The mediocre student group might even include students who struggle with their learning, which needs to be taken into account in the training and planning of the curricula.

Teacher educators must think about how to support the development of students' learning strategies during training for them to become flexible professionals capable of generating novel ideas and educational innovations while planning the local curriculum and designing and adopting pedagogical innovations (Lavonen et al. 2020). In the teaching profession, reproduction and memorisation of facts and procedures is inadequate; an active, productive stance towards knowledge is required (Damşa et al. 2010). It is important to recognise students who need support in their learning strategies to enable timely and tailored support, such as early recognition of learning challenges and interventions by student counselling. Further, in order to guide students towards more favourable learning strategies, they should be made aware of their strategies and their relations to study success (Coertjens et al. 2017). Recent changes, such as digitalisation and multiculturalism, present novel challenges to teacher education in Finland, as in all of Europe (Klassen et al. 2018). If students have difficulties in basic learning skills, it might be difficult to respond to these challenges during their studies and in their future work. To conclude, it is important for teacher educators to acknowledge that the students are rather mediocre in the academic sense, even reproductive and lacking regulation skills, and thus might need support in developing into professional learners.

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