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# Distinct competence profiles of health sciences teacher students: A cross-sectional study

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## TIIVISTELMÄ

Tämän tutkimuksen tarkoituksena oli tunnistaa terveystieteiden opettajaopiskelijoiden osaamis-profiileja, kuvata osaamista profiilien mukaan ja selvittää profiileihin liittyviä tekijöitä. Tutkimus toteutettiin Suomessa poikkileikkaustutkimuksena talvella 2018–2019.

Terveystieteiden opettajankoulutusohjelmissa opiskelevat terveystieteiden opettajaopiskelijat (N=315, n=101) kutsuttiin osallistumaan tutkimukseen. Tiedonkeruussa käytettiin Sosiaali- ja terveysalan opettajan osaamismittaria. Osallistujien osaamisprofiilien määrittelemiseksi tehtiin K-means-klusterointianalyysi. Profiilin A (Aloittelevan osaaminen) opiskelijat arvioivat osaamisensa heikommaksi kaikilla mitatuilla osaamis-alueilla kuin profiilien B (Hyvä osaaminen) ja C (Edistynyt osaaminen) opiskelijat. Näyttöön pe-

## ABSTRACT

**Distinct competence profiles of health sciences teacher students: A cross-sectional study**
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The presented research aimed to identify the competence profiles of health sciences teacher students, describe the competence according to the profiles, and explore the associated factors. The research applied cross-sectional design and was conducted in winter 2018–2019 in Finland.

The teacher students (N=315, n=101) studying in health sciences teacher degree programs were invited to participate. The Health and Social Care Educator's Competence instrument was used to

rustuvan käytännön osaaminen (keskiarvo 2,97, SD 0,37) oli vahvin osaamisalue ja Yhteistyö ja verkosto-osaaminen (keskiarvo 1,86, SD 0,34) heikoin osaamisen alue.

   Osaamisen arviointi voi auttaa tunnistamaan haastavia aiheita opetussuunnitelmatasolla sekä kartoittamaan opiskelijoiden ammatillista kehitystä opintojen eri vaiheissa.

collect data. A K-means clustering analysis was performed to define participants' competence profiles. Students in Profile A (Beginner competence) provided weaker assessments across the measured competence areas than students in Profiles B (Good level of competence) & C (Advanced competence), with competence in evidence-based practice (mean 2,97, SD 0,37) the strongest area and competence in collaboration and societal issues (mean 1,86, SD 0,34) the lowest rated area. Competence evaluation can help identify challenging topics at the curriculum level and chart the professional development of students at different stages of their studies.

**What is known about this topic?**
- Student's competence development should already be examined during studies so that the education can be quickly modified to reflect future competence requirements.
- Competence surveys help ensure that education develops the skills needed in working life.
- Studying the competences that students require in the future can improve education.

**What this paper adds?**
- The students in this study rated the competence of evidence-based practice and student-centered pedagogy as their highest level of competence in all profiles.
- Health sciences teacher students' background and stage of studies was found to influence their competence.

**What significance does research have for nursing, nursing education and management?**
- The results of the study provide national information on the competence produced by health sciences teacher education and the factors influencing the level of competence.
- The results of the research can be used in the development of curricula and learning content for health sciences teacher education.
- In health sciences teacher education, already in the early stage, attention must be paid to develop competence in collaboration and societal issues.

## Background

   High-quality teacher education produces skilled, competent, and influential teaching staff, and as such directly impacts the quality of education for health professionals as well as patient safety and the efficiency of the health care system (Vilén & Salminen 2016). Identifying the core competencies that educators will require during their careers can help highlight what type of education and guidance students will need at different stages of their teaching studies. This approach can also be leveraged to assess the development of competence and identify challenges on the curricular level. Health sciences teacher students recognize and define areas of an educator's competence in much the same way as educators already in the profession (Mikkonen et al. 2019a, Mikkonen et al. 2019b). Recent international suggestions have stated that competence, as well as progress of competence development, should already be com-

prehensively examined (or measured) during health sciences teacher students' studies so that the education can be quickly modified to reflect future competence requirements (OECD 2018, Unesco 2019, Voinea, 2019).

Educational programs, along with the minimum qualifications or required competencies, for health sciences educators – who work at universities, university of applied sciences or vocational colleges - vary between countries. Furthermore, there is no consensus on the minimum qualifications and required experience of the educators (WHO 2016). However, it seems that the informal international consensus is that a health science educators should have a Master's or doctorate degree and at least two years of work experience in health care (European Commission 2009, Paul 2015, Oprescu et al. 2017). The curricula for health sciences educators are designed to foster the competencies that the educators need to guide and train future health professionals.

According to Le Deist and Winterton (2005), competence is a concept that describes an individual's knowledge, skills, abilities, attitudes, values and experiences that will enable him/her to complete tasks and achieve goals at the expected level (Gonzi 2013). Professional competence – as a more specific concept - is understood to include the ability to manage ambiguous problems, tolerate uncertainty, and make decisions with limited information. As such, this concept can be expanded to comprise the habitual and judicious use of communication, knowledge, technical skills, reasoning, emotions, values, and rejection in daily practice for the benefit of the individual and community (Delamare Le Deist & Winterton 2005). While professional competence is personal in the sense that it is the individual who exercises and develops competence, each individual also expresses their skillset when acting in their professional role. In this way, competence exists and develops socio-personally (Sandberg & Pinnington 2009).

An educator's competence is directly shown in the way that they teach, and interact with students (Feiman-Nemser 2012). Health sciences educators' competence is complex as it is constantly changing according to local political dynamics and how health care is organized (Mikkonen et al. 2018). The competence of a health sciences educator has recently been defined and described. In these definitions is has been specified that health sciences educators are required to work in areas of curriculum planning, evaluation and implementation; demonstrate substantial theoretical and practical knowledge, along with relevant skills for working life; a mastery of implementing evidence-based knowledge, management and leadership skills, pedagogical knowledge of educational theories, learning processes and evaluation methodologies; the ability to use digital technologies in versatile teaching environments; as well as generic skills, including critical thinking, communication, collaboration, decision-making, ethical conduct, and continuous professional development (WHO 2016, European Commission 2017, Mikkonen et al. 2018, Mikkonen et al. 2019a, Christensen & Simmons 2019, Labrague et al. 2020, Salminen et al. 2021).

The measurement and assessment of competence is an essential part of education which enables the monitoring of higher education systems, education and the individual competence needed to support policy decision-making (OECD 2020). In health care processes, measuring competence is a metric meant to gauge the quality and effectiveness of care and health care activities (Nummela et al. 2019) as well as evaluate the retention and well-being of professionals (Biagioli 2018). For example, high levels of competence play a significant role in ensuring safe health care (Gunawan 2019), while competence assessments and

monitoring provide evidence that educational institutions are preparing an effective health care workforce (Gibson et al. 2019). One current stance is that the training of health care professionals should promote the learning of general skills that are shared by all of the professionals involved in care provision (Nummela et al. 2019). Generic competence refers to common elements of competence, such as the ability to learn, make decisions, plan projects, analyze and synthesize knowledge and, for example, manage skills in interpersonal relationships. These abilities and competence are needed in all kinds of working life. Generic competences are increasingly important for a society, characterized by dynamism and constant change. The development of general competencies enables the achievement of learning that is valid in any situation and working life (Almendina & Rodriguez 2019).

Relatively little attention has been paid to the competence of health sciences educators (Mikkonen et al. 2018, Salminen et al. 2021), this niche topic has been studied to an increasing extent during the past few years. However, the competence of health sciences educators has mostly been studied in terms of specific competence areas, e.g., environmental competence (Parker et al. 2020), competence in wellness (Magnusson et al. 2020), ethical competence (Koskinen et al. 2020), and competence in digital pedagogy (Ryhtä et al. 2020). Nevertheless, a few studies have investigated health sciences educators' competence from a general point of view (Mikkonen et al. 2018, Zlatanovic 2018, Mikkonen et al. 2019b, Salminen et al. 2021). Mikkonen et al. (2020) generated a national model of health sciences educator competence and evaluated educators' competence using a self-assessment survey. Previous studies concerning health science teacher students' competence has focused on teacher-students' skills (Salminen et al. 2009), competence in simulation-based teaching (Topping et al. 2015),

and digital competence (Salminen et al. 2016, Autio et al. 2018). However, a more extensive understanding of the versatile competence that future educators require in their daily work has not been previously discussed.

Competence assessment at different stages of education can provide information about the students' competence needs during the education and give the opportunity to develop the education in the necessary direction. In this study, we aimed to examine the competence of health sciences teacher students, group students based on their self-assessed competence, and find the differences or similarities. The advantage of the profile analysis is that it allows the data to determine the optimal number of solutions (profiles), improving the probability of a participant belonging to one of the profiles (Weaver & Kim 2008). In this study, competence profile refers to teacher students' competence according to their own assessment in a particular group.

## Research aim

The presented research aimed to identify the competence profiles of health sciences teacher students, describe the competence according to the profiles, and explore the associated factors.

The research was guided by the following questions:

1. What kind of competence profiles can be identified for health sciences teacher students?
2. What kind of factors associate with the competence profiles?

## Methods

A national cross-sectional research design was used to conduct the study between autumn 2018–spring 2019 in Finland.

*Participants*

All of the teacher students (N=315) from all annual courses enrolled in health sciences teacher degree programs at six universities in Finland were invited to participate in the study. As such, the study was open only to health sciences students majoring in nursing science or rehabilitation who were studying at one of the six Finnish universities offering a master's degree in education. Teacher students in these programs are allied healthcare professionals, including, for example, nurses, midwives, physiotherapists, occupational therapists, bio-analysts or radiographers. Participation in the study was voluntary. Participants were informed that they could discontinue their participation in the study at any stage of the study. In addition, they were informed about anonymity; individuals or organizations cannot be identified at any stage of the research. Teacher students were recruited by the university contact person assigned by each organization participating in the study. In order to reach a sufficient sample size for the study, all of the teacher students in Finland were invited.

*Instrument and measurements*

The Health and Social Care Educator's Competence (HeSoEduCo) instrument, which includes eight latent variables and 43 items, was used to collect data in the study (Mikkonen et al. 2020). HeSoEduCo is a self-assessment instrument that measures distinct competence areas in health and social care education, namely, competence in evidence-based practice (8 items), competence in digital collaborative learning (5 items), competence in student-centered pedagogy (8 items), competence in collaboration and societal issues (5 items), competence in leadership and management (6 items), competence in cultural & linguistic diversity (4 items), competence in mentoring students in professional competence development (4 items), and competence in subject & curriculum (3 items). Respondents grade the items using a four-point Likert scale (1-fully disagree, 2-disagree to some extent, 3-agree to some extent, and 4-fully agree).

The HeSoEduCo instrument has been previously validated on health and social care educators. Instrument's content validity was tested with the content validity index method; the structural validity has been tested with confirmatory factor analysis identifying eight-factor model (Mikkonen et al. 2020). Reliability testing was performed with Cronbach alpha, showing good reliability. Since the instrument has not previously been used on students, four experts assessed the face and content validity of the instrument. The experts included both Master's degree teacher students and educators. The questions and content of the instrument were found to be clear and relevant and no changes to the instrument has been made. The instrument was further pilot tested on four students, with no changes to the instrument required based on the results. For this reason, the pilot data were included in the total sample. The instrument showed high reliability in this study, as demonstrated by Cronbach's alpha values ranging from 0,75–0,90.

*Data collection*

Data were collected via a contact person provided by each organization. The contact persons sent teacher students an email which included an information letter on the study and a Webropol-link to the questionnaire. The invitation was sent once, while four reminders were sent every two weeks during the data collection period. Since online questionnaires are sometimes characterized by low response rates, two universities also distributed a paper questionnaire. Questionnaire included 11 background questions in addition to the HeSoEduCo instrument. The background questions were included to

gather information about participants' ages, educational backgrounds and factors relating to their current employment.

*Data analysis*

The data were analyzed by two researchers (HMK, KM) using SPSS Statistics (version 25,0; IBM Corporation, Armonk, NY). Missing data were assessed with Missing at Random (MAR), Missing Completely At Random (MCAR) and Missing Not at Random (MNAR) tests. There were no instances in which a survey included more than 5% of missing data per variable. Frequency and percentage distributions, means and standard deviation were used to describe participants' background information. A K-means clustering analysis was performed to determine profiles among the teacher students. Five different analyses have been conducted by testing variations of profile division among the sample. Finally, the optimal variation was sample division into three profiles. The three distinct profiles have been tested by using non-parametric outcome measurements (including the Kruskal-Wallis and a Mann-Whitney tests). Chi-Squared and one-way ANOVA tests were used to determine whether the participants differed significantly in their background information. The threshold for statistical significance was set as p-value<0,05 (Munro 2005). The competence levels of teacher students were interpreted as low (Likert scale score <2,49), intermediate (2,50–3,49), and high (>3,50).

*Ethical issues*

The study considered ethical principles (Declaration of Helsinki 2013) and legislation regarding personal data (GDPR 2016). The primary developer of the HeSoEduCo instrument granted permission for its use in this study (TerOpe-project team 2018). Research permission was obtained from all six participating universities. The students re-

ceived information about the study which specified that participation was voluntary. Replying to the questionnaire was considered as informed consent.

## Results

*Participant characteristics*

A total of 101 teacher students, representing a response rate of 32%, from six Finnish universities responded to the survey. A majority of the participants were women (92,1%), while only eight (7,9%) were men. Participants were between 23 to 66 years old, with a mean age of 36 years (9,09 SD) and had an average of 7,5 years of work experience in the health care field. A majority of the teacher students (n=95, 94%) reported nursing science as their major, while 6% were studying rehabilitation science.

*Teacher students' competence profiles*

The teacher students were divided into three distinct competence profiles (A= Beginner competence, B=Good level of competence and C=Advanced competence) based on their self-assessments. The characteristics of the competence profiles, along with their differences, are shown in Table 1. Profiles A, B, and C included 23 (22,7%), 49 (48,5%), and 29 (28,7%) teacher students, respectively, while these three profiles significantly differed (p<0,001) across all competence areas. Regarding participant characteristics, the profiles only significantly differed in terms of age (p<0,001), with profile A showing the youngest average age.

The average age of teacher students in Profile A was 32 years, with 87,0% of the students being women and 13,0% men, which represented the highest percentage of men among the three profiles. Of these students, 44,5% had a BA degree from a university of applied sciences while 56,5% held a BA degree from a university. Profile A

Table 1. Teacher students' profiles (n=101).

| Characteristics and competence | Profile A (n=23) | Profile B (n=49) | Profile C (n=29) | p-value |
|---|---|---|---|---|
| Age in years, mean (SD)^ | 31,61 (5,22) | 35,41 (8,96) | 40,90 (9,75) | 0,001 [b] |
| Gender, n (%) | | | | |
| Female | 20 (87,0) | 45 (91,8) | 28 (96,6) | 0,443 [a] |
| Male | 3 (13,0) | 4 (8,2) | 1 (3,4) | |
| Education, n (%) | | | | |
| BA degree from a university of applied sciences | 10 (43,5) | 9 (18,4) | 7 (24,1) | 0,005 [a] |
| BA degree from a university | 13 (56,5) | 37 (75,5) | 15 (51,7) | |
| MA degree from a university | 0 (0,0) | 3 (6,1) | 7 (24,1) | |
| Year when highest degree was completed, mean (SD) | 2014 (4,82) | 2015 (4,87) | 2015 (5,84) | 0,625 [b] |
| Work experience in corresponding field, years, mean (SD) | 5,73 (4,11) | 7,3 (8,54) | 9,18 (8,50) | 0,280 [b] |
| Health science degree starting year, mean (SD) | 2016 (1,96) | 2015 (1,47) | 2015 (1,55) | 0,369 [b] |
| Pedagogical education, n (%) | | | | |
| Vocational pedagogical education | 0 (0,0) | 1 (2,0) | 0 (0,0) | 0,705 [a] |
| Health sciences pedagogical education | 23 (100,0) | 47 (95,9) | 29 (100,0) | |
| Educational sciences pedagogical education | 0 (0,0) | 1 (2,0) | 0 (0,0) | |
| Area of health science degree, n (%) | | | | |
| Nursing sciences | 22 (95,7) | 47 (95,9) | 26 (89,7) | 0,299 [a] |
| Rehabilitation and physiotherapy | 1 (4,3) | 2 (4,1) | 3 (10,3) | |
| Work experience as an educator, in months, mean (SD) | 2,43 (10,40) | 2,96 (7,66) | 8,21 (14,32) | 0,071 [b] |
| Current employment as educator, n (%) | | | | |
| No employment as educator | 21 (91,3) | 39 (79,6) | 20 (69,0) | 0,099 [a] |
| Part-time teacher | 0 (0,0) | 9 (18,4) | 6 (20,7) | |
| Full-time teacher | 2 (8,7) | 1 (2,0) | 3 (10,3) | |
| Competence in evidence-based practice | 2,97 (0,37) | 3,42 (0,35) | 3,68 (0,27) | 0,001* |
| Competence in leadership and management | 2,23 (0,38) | 2,60 (0,33) | 3,21 (0,27) | 0,001 |
| Competence in collaboration and societal issues | 1,86 (0,34) | 2,50 (0,31) | 3,23 (0,43) | 0,001 |
| Competence in subject and curriculum | 2,14 (0,55) | 2,80 (0,34) | 3,42 (0,42) | 0,001 |
| Competence in mentoring students in professional development | 2,41 (0,45) | 3,10 (0,31) | 3,68 (0,29) | 0,001 |
| Competence in student-centered pedagogy | 2,58 (0,43) | 3,16 (0,23) | 3,74 (0,18) | 0,001 |
| Competence in digital collaborative learning | 2,06 (0,55) | 2,77 (0,52) | 3,28 (0,50) | 0,001 |
| Competence in cultural and linguistic diversity | 2,42 (0,55) | 2,90 (0,41) | 3,28 (0,49) | 0,001 |

LIKERT SCALE 1-4 (1-fully disagree, 2-disagree to some extent, 3-agree to some extent, and 4-fully agree)
^ M mean (SD: standard deviation); [a] Chi-Square; [b] one-way ANOVA test; * Kruskal-Wallis test
p<0,05 (marked in bold)
Competence levels: low= < 2,49; intermediate= 2,5–3,49; and high= > 3,5

teacher students had an average of six years of work experience in the health care field. All, of the Profile A students started their studies in 2016. and demonstrated an average of two months of work experience as a teacher. Students in Profile A provided weaker assessments across all of the measured competence areas than students in other profiles. Profile A students evaluated the competence in evidence-based practice (mean 2,97, SD 0,37) the strongest area and competence in collaboration and societal issues (mean 1,86, SD 0,34) the lowest rated area.

The average age of Profile B students was 35 years. 18% of these participants, had a BA degree from a university of applied sciences while 75,5% had a BA degree from a university. These students had an average

of seven years of work experience in the health care field. All of the Profile B students had started their studies in 2015 and they had an average of three months of work experience as an educator. A noticeable share of the students (18,4%) had worked part-time as an educator. The students evaluated most confident in their competence in evidence-based practice (mean 3,42, SD 0,35) and the least confident in their competence in collaboration and societal issues (mean 2,50, SD 0,31).

The average age of profile C students was 41 years, with 24,1% holding a BA degree from a university of applied sciences, 51,7% holding a BA degree from a university, and 24,1% having completed a MA degree at a university. These students had an average of nine years of work experience in the health care field and all students started their studies during year 2015. Students had an average of eight months of work experience as an educator, with 10,3% working full-time and 20,7% part-time. Profile C students evaluated their competence in student-centered pedagogy (mean 3,74, SD 0,18) the highest and gave the lowest scores to their competence in leadership and management (mean 3,21, SD 0,27).

## Discussion

The presented research aimed to identify competence profiles among health science teacher students, as well as explore the factors related to these profiles. According to the results, students with the highest levels of competence (Profile C) differed from students belonging to the other two profiles, mediate competence (Profile B) and low competence (Profile A). The profile C students were older and had higher educational qualifications. Profile C students also had more work experience as an educator than Profile A & B students. Previous studies (Heinrichs et al. 2020, Paloniemi 2006) have identified work experience as one of the main factors which influence competence. Yet Paloniemi (2006) emphasized that work experience alone does not guarantee competence (Paloniemi 2006). According to Heinrichs et al. (2020), work experience builds the expertise and knowledge required to effectively make decisions, prioritize goals, and develop ways to achieve those goals.

The competence of evidence-based practice and student-centered pedagogy was shown to be consistently high in all profiles. Camargo et al. (2018) found that health care workers with higher educational qualifications show certain characteristics that are conducive to evidence-based practice (Camargo et al. 2018). The result that health science teacher students are confident in their evidence-based teaching skills is important as this has long been understood to be the basis of effective teaching, i.e., educators need to understand the connection between research and practice (Wieser 2018). Education should be based on the best available current knowledge, while teaching methods should be efficient, economical and support learning (Joyce 2019).

Student-centered pedagogy is crucial to teaching. For example, several studies have found that student-centered pedagogy is related to the success of students' professional development. Autonomy, responsibility for one's own learning, self-regulation, and motivation – along with the skilled use of information technologies – leads to successful student-centered pedagogy (Song 2019, Mollman & Bondmass 2020). Profile C students self-evaluated their competence in mentoring students in their professional development the highest of all the measured areas of competence. Educators need to be able to positively respond to diverse student learning needs, foster professional growth and tackle social inclusion issues (Veitch et al. 2018). In this way, a positive learning experience is largely determined by faculty support and supervi-

sion (Luhanga et al. 2008). In contrast to our finding, previous research has highlighted, that educators need additional tools and competence to guide students in different learning situations (Luhanga et al. 2008, Heinonen et al.,2019), and this is especially relevant when a student needs special support (Veitch et al. 2018). On the other hand, current technologies can be pivotal in building a close student-teacher relationship (Hershkovitz et al. 2019). The teacher students included in this study were part of the Master's degree programme in health sciences, which puts a strong emphasis on evidence-based health care (Mikkonen et al. 2019b). Evidence-based healthcare has been well-thought-out in the Finnish healthcare system and health education. Also, student-centered pedagogy has a strong educational emphasis in Finnish education and is regulated by the Ministry of Education and Culture (Ministry of Education and Culture 2019).

An interesting difference between the three profiles is that Profile C students rated leadership and management as their weakest area of competence. Profile A students gave intermediate ratings to this area of competence, as it was the fourth strongest competence area. Leadership and management was the third lowest rated competence area among Profile B students. Previous research has shown that leadership is a broad and demanding area of expertise, and that health sciences educators have a leadership role as clinical experts, role models, mentors, and supporters of quality projects. Furthermore, they are responsible for developing more holistic models of patient care (Mikkonen et al. 2018, Zlatanovic et al. 2017). Leadership has been identified as key component of both teamwork between qualified nurses and effective team training programs. Leaders who are actively involved in coaching, mentoring, and supporting employees were able to help learners successfully apply the knowledge they learned to

their practical work (Barton et al. 2018). The result regarding leadership presented in this study may be explained by the fact that profile C students have – on average – worked in the health care sector longer than the other students and have also previously worked as leaders. As such, they are experienced in the broad context of leadership and are aware of what competences are necessary to carry out managerial tasks.

When considering the details of the three profiles, Profile A students were the youngest (mean 31,61) and had the least working experience (5,73 years) of all the responding teacher students. Their highest degree was completed 2014. Furthermore, nearly half of the Profile A students had their highest degree (Ba degree) from a university of applied sciences. Hence, it seems that Profile A students switched to health sciences teacher studies soon after graduating from clinical positions. This may reflect the demanding and unstable working life associated with clinical occupations (see Moloney et al. 2018, Karakachian et al. 2019, Kox et al. 2020), as such, certain staff may seek other professions in health care instead of clinical positions. This result also suggests that novice professionals might experience more stress at the beginning of their careers (Kox et al. 2020, ten Hoeve et al. 2020) and would need more support from their seniors at these points (Beale 2016, ten Hoeve et al. 2020).

Previous studies have revealed that health sciences educators struggle with digital competence (Oprescu et al. 2017, Zlatanovic et al. 2017). The teacher students who participated in this study did not describe digital competence as one of their weaker areas of expertise. Salminen et al. (2016) reported a similar result, i.e., students' teachers are motivated to use ICT and want to develop their skills. Furthermore, McQueen et al. (2017) and Autio et al. (2018) reported that today's students are skilled at using a wide variety of new and changing technologies. These results suggest that the digital competence of

health sciences educators – which has been identified as a core competence of these educators by the WHO (2016) needs further attention, as health science educators are pivotal to guiding students to develop the technical skills, they will require for future positions in health care (McQueen et al. 2017, Bristol 2019a, Bristol 2019b).

*Limitations*

As the study was conducted in Finland, the responses of the participating health sciences teacher students concerning competence are related to the Finnish education system. Because education systems vary from country to country, the presented results may be generalizable to other educational contexts with caution. Another limitation was the small sample, but this was unavoidable since the study only targeted Finnish health science teacher students. Although the sample was small, there were an even number of respondents from the five universities that participated in the study from different parts of Finland. There were fewer participants from one university than others, which could have affected the results. The presented results have identified a need for further international studies and comparisons regarding health science educators' and teacher students' competence.

## Conclusions

Different areas of competence are emphasized at different stages of teacher education. In this study, three distinct teacher students' profiles were distinguished based on health science teacher students' self-assessed competence, stage of studies, and work experience. In this study, at the beginning and in the middle of the studies, the students felt that they had the least competence, especially in collaboration and societal issues. For this reason, atten-

tion needs to be paid to the development of collaboration and societal issues competence in the development of education and curricula at the very beginning of studies. At the end of the studies, leadership and management competence were perceived as the weakest, and for this reason, at the end of the studies, it would be good to pay close attention to developing leadership and management competence further. Additionally, continuous career development needs to be emphasized to the students at the end of their studies.

Competence evaluations help to map the skillset of teacher students to identify challenging topics at the curriculum level and evaluate the professional development of students at different stages of their studies. These measurements are one part of ensuring that health care education develops the competences that graduates will require in their professional roles. Future research should compare the competences of students and working professionals, as well as determine how both education and work experience have shaped competence development.

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