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Abstract

The benefits of peer teaching have been intensively explored. However, there is still a lack of research in relation to student integration in higher education. The purpose of this study is to explore the relationship between peer teacher interaction and students' experiences of components of integration in the study programme. This comprises student and teacher interaction and support as well as identification with the programme. In addition, the aim is to explore how the students experience peer teachers as effecting their integration into the programme, and to explore how they visualise the relationship between students, teachers and peer teachers as part of the programme. Peer teaching was implemented in an introductory course in Environmental Sciences, in which the peer teachers were responsible for organising and teaching the course. The study was conducted with a mixed-method approach combining questionnaire data (N=115), open-ended experiences (N=80) and sketches (N=80) done by the students participating in the course. The results show that peer teaching affected student integration in several ways. Practical implications and future research are also discussed.

Introduction

Student engagement in the academic community is at the centre of their integration into university study. As society changes, the sense of community and interaction between people has become increasingly important. Social connectedness and integration have been found to be important factors in studying and several studies on this topic have been published (Allen & Robbins, 2008; Allen, Robbins, Casillas, & Oh, 2008; Rayle, Robinson Kurpius, & Arredondo, 2006). One way to support student integration into their higher education programme is peer teaching and learning. Peer influence is a significant and positive factor affecting students' persistence (Pascarella & Terenzini,

cop. 2005). In addition, it has been shown that peer-to-peer teaching can lead to better student engagement (Stigmar, 2016). However, peer-to-peer teaching is not always widely used in higher education, and at the university level there is a lack of research concentrating on peer teaching (Wakefield & Gregorius, 2012). Although peer teaching has been shown to have a positive effect on studying, there has been insufficient research about the opportunities that peer teaching might have in effecting student integration.

One way to define student integration is based on Tinto's (1975) theoretical model on dropping out from higher education. According to Tinto (1975), the major factors explaining students' persistence are academic and social integration. Social integration refers to students' interaction with the social system of the institution (university or college) including interaction with fellow students. Academic integration refers to teachers' interest in students and the role of study in supporting the students' intellectual development (Tinto, 1975). Social and academic integration have a significant impact on how students study in many ways (Noyens et al., 2019; Pascarella & Terenzini, 2005). However, interaction and integration do not always function properly. It has been found that students' and teachers' experiences of interaction and communality in their higher education faculty or department can vary considerably (Asikainen, Blomster & Virtanen, 2018) as students' and teachers' experiences vary from very positive and supporting interaction between the students and the teachers to even hostile experiences between teachers and students in the university context. Thus, the experience of communality should be promoted and developed in university contexts. The role of peer teaching has not been studied in relation to student integration even though it has potentially positive effects on students' experiences of studying at university. In the present study we will explore the relationship between peer teaching and the elements of student integration including student and teacher interaction and support as well as identification with the programme. The purpose was also to explore how the students experienced peer teaching as affecting their studying and how they experienced the communality in the study programme.

Theoretical framework

Peer teaching and learning

Peer learning, which is *the use of teaching and learning strategies in, with and from each other without immediate intervention of a teacher* (Boud, Cohen, & Sampson, 1999) has been widely used in higher education. Peer learning can also happen when the peers act as tutors or teachers. Peer tutoring is one form of peer teaching through which a more knowledgeable and advanced student helps a novice student to learn in cooperative pairs or small groups (Topping, 1996). Peer teaching or peer-to-peer teaching can be defined as teaching which happens between two students when one of them is the teacher (Iwasiw & Goldenberg 1993). A peer tutor or a peer teacher can be defined as having the same status as the student who is being tutored and works in cooperation with the teaching staff to facilitate learning. However, a peer teacher is not a teacher as such, i.e. a teacher who teaches new information to students (Stigmar, 2016). In the present study, we use the term peer teacher and focus on peer teachers who independently organised an orientation course for first-year students and took part in the teaching. The planning process and the implementation of the course was guided and supervised by the university teachers.

Peer teaching has been found to have multiple advantages. In a review study conducted by Stigmar (2016) it was shown that peer teaching promotes a deeper level of understanding and increases responsibility and monitoring of the learning process. It was also suggested by Stigmar (2016) that peer teaching can develop a variety of generic skills, such as critical thinking, and that it also supports student engagement in learning and studying. Furthermore, peer teaching allows students to engage and it has been shown that retrieval practices promote learning better than elaborative studying, for example (Karpicke & Blunt, 2011). Furthermore, peer-assisted and self-directed learning are important ways to promote students to become life-long learners and help them to develop important working-life skills such as critical thinking, people skills and reflective practices (Boud et al., 1999; Boud, Cohen, & Sampson, 2014).

Peer teaching has been found to be effective because the peer teacher and the students share a similar knowledge base, which helps the students to understand the subjects or concepts better (Cornwall, 1980). In addition, it has been shown that compared to conventional teacher-driven classes, the atmosphere in peer-to-peer teaching can be more relaxed and informative, which may promote student learning (Wakefield & Gregorius, 2012). Peer-to-peer teaching might also be less threatening, because the informal interaction between peers is less than between a student and the teacher (Ladychewsky & Ryan 2002). Some studies have shown that peer tutoring can have an effect on students' sense of communality and connectedness. Buraphadeja & Kumnuanta (2011) explored 277 higher education students' experiences of connectedness and communality with an experimental design comparing students with and without peer tutoring. The results showed that students who received peer tutoring experienced more interaction among students, feelings of connectedness and satisfaction in achieving their learning outcomes. In other studies, peer tutoring has also been found to be related to sense of community or belonging (Fougner, 2013). To summarise, peer teaching has been shown to have a positive effect on students' relationship with other students and teachers, as well as improving their sense of belonging to the programme.

Student integration into the academic community

Students' integration into their programme has been widely researched (Asikainen, 2018; Deil-Amen, 2011; Karp, Hughes, & O'Gara, 2010-2011; Pascarella & Terenzini, cop. 2005; Tinto, 1975). According to Tinto (1975), the reason students drop out from college is the inefficient integration into college socially and academically, that is to say, lack of social and academic integration. It has been shown that academic and social integration interact mostly by reinforcing each other (Pascarella & Terenzini 2005). Social interaction is an important component in student integration. It has been shown that the relationship between students and academic staff is very important. A large study conducted with 24 000 students across 200 universities and colleges showed that student-academic staff interaction is a crucial factor affecting many aspects in student integration including students'

overall satisfaction, attainment, learning outcomes and graduation with honours (Astin, 1993). In addition, Pascarella and Terenzini's meta-analysis showed that support from academics in teaching and other situations has a major impact on students' graduation and persistence (Pascarella & Terenzini, 2005). Despite the importance of the student-teacher relationship, teachers have often been shown to be unaware of their significant role in tutoring the students (Stephen, O'Connell, & Hall, 2008). The students who are successful in their study often consider their teachers to be friends, helpers and assistants (Halawah, 2006). Thus, we could assume that peer teaching could have a positive effect on students' experiences of teacher interaction and support.

In addition to the support from academics, the peer influence is also a significant and positive factor in students' persistence decisions (Pascarella & Terenzini, 2005). In addition, relationships with other students correlate statistically significantly with personal development (Halawah, 2006). It has also been found that students' experiences of peer support is positively related to their study progression at least when they start to study (Rytkönen, Parpala, Virtanen, Lindblom-Ylänne, 2012). In Finland, Kurri (2006) explored the factors behind students' struggle in continuing with their study. He stated that the support from peers is a major factor in keeping up study intensity. Students who experienced their higher education study to be problematic had the feeling of not being the member of a student group. It was also shown that one of the forces behind their academic struggle was the lack of help from fellow students (Kurri, 2006). To conclude, we can expect that peer teaching could affect student integration through their experiences of interaction with students and teachers.

In addition to interaction with other students and the teachers, student commitment to their study is an important part of integration as Tinto's (1975) model has shown. The importance of students' commitment in the study programme has been shown in earlier research. Mäkinen, Olkinuora and Lonka (2004) showed that students who were not committed to studying were less likely to continue, and were also absent more frequently. Rautopuro and Väisänen (2002) studied students' commitment and goal orientation at the university and found that first year commitment predicted continuation of

the study programme, and in fact, the most significant factor in students' dropping out after the first year was the lack of commitment. Students' commitment can also be explored through how well students identify with the programme which can be traced to social identity theory in social psychology (Tajfel 1978) in which social identity is a central part of identity and is formed from identifying ourselves as part of different groups and having a sense of belonging to a particular group. Students' experiences of identification with the university have been found to be positively related to student integration (Lähteenoja, 2010). In addition, the learning environment and the way students learn can also influence student integration. The interactive learning environment, which supports group work and higher order thinking skills, has been found in a longitudinal study by Braxton, Millem and Sullivan (2000) to support students' social integration. In addition, students' own academic development has also been found to be related to social integration. Thus, integration and commitment to their study can be regarded as being important for student learning in higher education.

Aim

The aim of this study was to explore peer teaching from the point of view of student integration into the study programme in a first-yea introductory course which was solely planned, coordinated and carried out by peer teachers i.e. advanced students. The aim was to examine:

- How students' experiences of peer teaching are related to students' integration, including experiences of teacher interaction and support, student interaction, and identification with the programme?
- How do the students experience the effect of peer teachers on their integration into the programme?
- How do the students visualise the communality and peer teachers' role in the programme?

Method

Context

This study was performed within the bachelor's programme in environmental sciences at the University of Helsinki, Finland. Sixty students are accepted annually to start their bachelor's programme. The target group in this study was the first-year students in 2017 and 2018 enrolled on an orientation course called Environmental Specialist1. The course was taught in the Finnish language over seven weeks. The aim of the course is to familiarise the students with the university learning environment.

The teaching method of the orientation course had traditionally been teacher oriented until the course was updated in 2016 with an emphasis on creating a model of peer teaching and giving undergraduate teaching assistants a substantial role in planning the contents and realisation of the teaching. In the renewed curriculum, a course for teaching assistants was developed and coupled with the orientation course. Every academic year, four to six second- or third-year students enrol in the teaching assistant course. They are supervised by teachers, but they plan, coordinate and implement the orientation course and handle student feedback independently. The teaching assistants meet the supervisors four times before the course and in addition are provided with pedagogical training and support. After the course, the teaching assistants have a feedback session and they write a report reflecting on their individual learning and on achieving the goals set for the teaching assistant course.

The teaching assistants in both years, 2017 and 2018, worked in teams of five. In 2017, all the teaching assistants were female, aged from 19 to 23 (median 19 years) and in 2018, the teaching assistant team comprised three female and two male students aged from 20 to 27 years (median 22 years). The teaching assistants are referred to as peer teachers in this research.

Participants

In 2017, 62 students took part in the course and completed the final questionnaire at the end of the course. Of these students, three skipped most of the questions and their responses were therefore

removed from the data, leaving 59 responses for analysis. In 2018, 64 students took part in the course and 56 students completed the questionnaire. In 2017 and 2018, 40 students participated in the gathering of qualitative data by answering the open-ended question "How did the peer teachers affect my integration into the programme?" and provided a sketch of themselves as a part of the programme in the final contact session. The descriptions of the course participants can be seen in Table 1.

[table 1]

Data

The quantitative data consisted of students' responses to Likert scale items concerning students' experiences of integration adapted from a questionnaire (Pascarella & Terenzini, 2005) based on Tinto's (1975) theoretical model. The items measured dimensions concerning teacher interaction and support and student interaction. Questions concerning peer teacher interaction and support were conducted according to the teacher interaction and support questions by replacing the teacher with a peer teacher. Questions concerning identification with the programme were based on questionnaires by Brown et al. (1986) as well as Mael and Ashforth, (1992) and were translated and modified for the Finnish context by Lähteenoja (2010). Five of the items measured identification with the programme, four related to each of peer teacher interaction and teacher interaction, and six to student interaction. The Likert scales ranged from 1 (=totally disagree) to 5 (=totally agree). Furthermore, the qualitative data comprised students' answers to an open-ended question and their sketches about themselves as part of the programme. These were collected as follows. In the last contact session, several assignments were arranged for the students. They moved in small groups from one "pitstop" to another. In one of the stops, each student had a canvas in front of them. Each student was asked to do two assignments independently. Firstly, the student had three minutes to answer an open-ended question "How did the peer teachers affect my integration into the programme?" Secondly, each student was asked to sketch on the canvas their perception or experience of their own role or position in the study programme. The assignment was given as "Draw yourself as part of your study

programme”. In the sketch they were asked to include the four actors involved in the programme: 1) themselves i.e. the role “me”), 2) a fellow student in the programme, 3) the peer teacher and 4) the teacher. They were given tiny post-it notes with colours corresponding to the defined roles. They could use as many post-it notes as they wanted to depict multiple individuals in each role. The students had four minutes to complete this. The data gathering was performed identically in 2017 and 2018.

Analysis

The study was conducted with a mixed-method approach combining quantitative and qualitative data to get a rich view of students’ experiences (Teddle, 2009). The rationale for mixed-method research is that it captures issues which qualitative and quantitative methods alone cannot tackle so well (Ivanova et al., 2006). In this case, the rationale was first to see quantitatively how students’ experiences of peer teaching were related to central components of integration and then to deepen this understanding qualitatively as to the students’ experience of how the peer teaching affected the integration and peer teachers role in the programme. A Sequential Explanatory Design (Way, Stauber, Nakkula & London 1994) was used, in which the purpose is to explain the preliminary quantitative results more closely with a qualitative analysis (Plano Clark & Creswell 2008, 466). In this study, this meant that the qualitative data from open-ended answers and sketches were explored to explain more profoundly the role of the peer teachers behind the statistically significant connection of student integration and peer teacher-student interaction found in the quantitative data. The quantitative analysis was conducted with the data from both years combined. Exploratory factor analysis with the Oblimin Rotation and Maximum likelihood factoring was conducted on the scales measuring identification with the programme, teacher-student interaction, peer teachers-student interaction and student interaction. The number of factors was estimated according to eigen values and communalities as well as the factors structure (Thompson, 2004). The relationship between the

variables was examined with Pearson's correlation analyses. Students' experiences were compared in several years using One-way ANOVA.

Open-ended answers

The students' answers to the open-ended question "how did the peer teachers affect my integration into the programme?" was analysed using qualitative content analysis, more precisely *inductive category development* (Flick, 2002; Mayring, 2000), in which the categories are formed without *a priori* categorisation. The data were analysed in steps: 1) All four authors independently read the students' answers several times, then 2) the authors independently categorised the answers 3) which were then discussed with the other authors. In this phase, the categorisations were similar but there were some differences in the analyses. Thus, the authors agreed on new categories and 4) each independently analysed the data again. 5) The categories were then discussed with the other authors, modified and finalised. Finally, representative quotes were selected for each category.

The analysis of the sketches

The sketches were analysed according to *thematic analysis* (Braun & Clarke 2006), which was used deductively to identify, analyse and interpret repeated meanings or themes in the data. The analysis focused on the interaction between the different actors (me, student, peer teacher, teacher) with an emphasis on the role of the peer teacher. First, following the stages of the thematic analysis (Braun & Clarke 2006), the authors familiarised themselves with the pictures and talked with each other about various aspects which caught their attention. Second, the authors collectively organised and categorised the pictures into groups by the recurring themes that had been identified. The focus was primarily on the role of the peer teacher in the drawings: if they were a subset of the students, or if they were viewed as teachers or as actors between students and teachers. Third, the drawings were categorised according to the interaction between the different agents: were they equal agents interacting with each other or was there a hierarchy or some other distinct relationship between them.

The authors discussed the pictures and organised them into categories based on these factors until they reached consensus.

Results

The final factor solution concerning the scales had four factors. The factors were described as F1) Student interaction; F2) Teacher interaction and support; F3) Student identification with the programme; and F4) Peer teacher interaction and support. Cronbach's alphas for the factors measuring these scales ranged between .725 and .894. The factor loadings and Cronbach's alphas can be seen in Table 2.

[Table 2]

All the dimensions correlated positively and statistically significantly with each other (Table 3). The highest correlations were found between peer teacher interaction and support and teacher interaction and support ($r=.61$, $p<0.001$) and student interaction ($r=.53$, $p<0.001$). In addition, the identification as part of the programme correlated statistically significantly with teacher interaction and support ($r=.29$, $p=.002$), peer teacher interaction and support ($r=.32$, $p=.001$) and student interaction ($r=.43$, $p<0.001$). Finally, teacher interaction and support correlated positively with student interaction ($r=.38$, $p<0.001$). The correlations can be seen in Table 3.

[table 3]

Students from both years experienced all the aspects quite positively. Interactions between the students were experienced especially well. However, there were some differences in the experiences of peer teacher-student interaction. In 2017, students experienced the peer teacher-student interaction more positively than in 2018. The One-way ANOVA analysis can be seen in Table 4.

[Table 4]

Open-ended questions

Most of the answers to the 3-minute open-ended question *How did the peer teachers affect my integration into the programme?* indicated very positive experiences relating to peer teachers. Two students in 2017 and two students in 2018 had a neutral view: in their opinion, peer teaching affected the situation in neither a positive nor a negative way. Both years one student raised a slightly negative point about peer teaching, however, none of the students viewed peer teaching solely negatively. The distribution of the categories can be seen in Table 5.

[Table 5]

From the open-ended questions, we recognised variations in the interactions between students and peer teachers and in the communality experienced by the students. Eleven dimensions emerged from the student answers (Table 6). Each student answer presented between one and several of these dimensions. For example, many students viewed peer teachers as informants or advisers, but also had the view that peer teachers were creating a good atmosphere in the course, thereby raising communality in the programme. All dimensions were present in both years, except for one dimension i.e. *IB Peer teachers sharing their personal experience from their study*, which was only present in 2018. In addition, five distinct categories emerged from our analyses; 1) Sharing of information and experiences; 2) Peer support and help; 3) Peer teachers inspiring, encouraging and motivating; 4) Elements of communality; and 5) Neutral or negative experience of peer teaching.

[Table 6]

Category 1 – Sharing of information and experiences

Within category 1 peer teachers were viewed as an important source of information and/or their own experiences. Within this category, the flow of information was one-way: from peer teachers to the students. Over half of the students (n=38, 2017; n=26, 2018) considered peer teachers to be informants or advisers, or ones sharing their experiences. Students had received information on

various aspects of the programme and its courses, as well as on university study in general, exchange study, and on motivation to study. Some students even described having received information on how to apply for jobs. This flow of information received by the students is shown in the following excerpts:

“[I] have received information on the programme” (Student 28, 2017)

“The peer teachers have given advice on topics related to studying, like how to apply for jobs and on motivation to study” (Student 1, 2017)

Besides sharing information, sharing the personal experiences of peer teachers was also viewed as being valuable by many students (n=17, 2017, n=8, 2018), which is shown in the following excerpts:

“[I] have received advice and opinions on courses based on personal experience” (Student 27, 2017)

“[The peer teachers] have given their personal viewpoints on things” (Student 6, 2017)

“It has been nice to hear the personal experiences of peer teachers related to studying and especially at the start of the programme...” (Student 30, 2018)

In 2018, three students recognised that the example given by peer teachers had been valuable, as shown in this excerpt:

“The peer teachers provide an example, they have experienced the education the same way it will be for us...” (Student 28, 2018)

This dimension was not included in the answers in 2017, because the teaching programme curriculum only started in 2017, and the students were the first cohort in the new curriculum.

Category 2 – Peer teachers as peer support

Category 2 is characterised with the element of support (given by peer teachers) and the need for support and help (expressed by the students). In addition, elements of emerging interaction between peer teachers and students could be noted within this category. In total, 14 (2017) and 7 (2018)

students, considered having received help from the peer teachers in a question or problem they had had. Peer teachers as peer support shows out in the following excerpts:

“[They have] allowed me to unscramble my thoughts” – many things are much clearer than [I] thought beforehand” (Student 21, 2017)

The peer teachers have helped me to understand many issues related to the university and studying” (Student 23, 2017)

“The peer teachers have made things easier at the start of the programme – peer support –it is comforting to have people in the course who have recently experienced starting university themselves ...” (Student 41, 2018)

Category 3 - Peer teachers inspiring, encouraging, motivating

In this category, 3 peer teachers were viewed in a very positive and inspiring manner. Students (n=4, 2017, n=6, 2018) felt that peer teachers were enthusiastic and motivating, and that they encouraged the students. This is shown in the following excerpts:

“[The peer teachers] have spurred me/us on...” (Student 15, 2017)

“The peer teachers have supported, and encouraged me/us...” (Student 14, 2018)

Category 4 – Elements of communality

Within category 4, elements of communality emerged in various ways and four dimensions were recognised within the category. Peer teachers were viewed as equals with student viewpoints rather than as teachers (n=9, 2017; n=17, 2018). One student also raised a point that the peer teachers had shown by example that even a second-year student is able to teach in the course. The dimension of student viewpoint is shown in the following excerpts:

“You get a student viewpoint on learning and the programme” (Student 31, 2017)

“Really well! They approach things like somebody of the same age, they are easy to approach, and they are encouraging...” (Student 35, 2018)

Peer teachers were also viewed as being easy to approach and available (n=3, 2017; n=4). They created a good atmosphere and had a positive effect on the course (n=3, 2017; n=19, 2018). These dimensions are shown in the following excerpts:

“The impact of peer teachers has been positive. They have made the lectures [and topics] easier to approach, as they have given examples from the student point of view. It has also been easier to ask them questions. In the lectures, they had a relaxed and nice “touch”... (Student 37, 2018)

Some students felt that peer teachers had truly helped them to become members of the community or the study programme (n=2, 2017; n=11, 2018) as shown in these excerpts:

“..[the peer teachers] have had a positive impact on [myself/students] becoming part of the programme” (Student 40, 2017)

“The peer teachers have supported and encouraged, and helped me to become part of the programme” (Student 14, 2018)

“[They] .. have made me feel part of the programme” (Student 25, 2018)

“The peer teachers have created an atmosphere which it has been good to be in” (Student 11, 2018)

Category 5. Neutral or negative experience of peer teaching

In category 5, students expressed no effect or slightly negative experiences of peer teaching. This category had the least number of answers (n=3, 2017, n=3, 2018). Two students in both years did not think peer teachers had either a positive or a negative impact on becoming part of the programme. In 2017, one student's experience was that several peers sharing their experiences was useful but occasionally slightly confusing, and in 2018 one student thought that the course had helped in getting

to know the other students, but perhaps a bit too efficiently as it created cliques within the class. None of the students viewed peer teaching solely negative.

These neutral and negative experiences are demonstrated in the following excerpts:

“I have not experienced any harm nor benefitted [from the peer teachers]” (Student 22, 2017)

“It has been useful to hear personal experiences and guidance by peers – many viewpoints: diverse and occasionally slightly confusing” (Student 30, 2017)

“The course has improved getting to know other students – however maybe slightly too efficiently. We are quite strongly divided into cliques...” (Student 12, 2018)

Students’ perceptions of communality in the programme

From the sketches, five main categories with two subcategories emerged from our analyses: 1) Everyone as equal actors, 1.1) Peer teachers as part of an equal group supporting the role “me”, 2) Peer teachers as mediators, 3) Peer teachers as students, 3.1 Peer teachers as supporters 4) Peer teachers as teachers and 5) Peer teachers with multiple roles (Table 7).

Category 1: Everyone as equal agents (2017 N=6, 2018 N=6)

In this category, all the agents (teacher, peer teacher, fellow student, “me”) are viewed as having an equal relationship with each other. The agents are not viewed in different roles but are placed next to each other, together or in a circle. An additional criterion for this category was that the interpretation of the sketch would not change if the agents switched places. Figures 1A and 1 B show examples representing this category. In Fig. 1A, the text also reads “Everyone as equal members of the university community”, confirming the interpretation of the equality of the agents.

Figure 1a and 1b

Subcategory 1.1 Peer teachers as part of an equal support network (2017 N=5)

This subcategory 1.1 includes sketches in which everyone except for the student himself or herself were viewed as equal agents (Fig. 2). The only difference to the main category 1. *Everyone as equal actors* was that the students had drawn themselves in the middle of the sketch with all other agents supporting the student. This category emerged only in the data collected in 2017. The following example represents the category:

[FIGURE 2]

Category 2. Peer teachers as mediators (2017 N=11, 2018 N=11)

In category 2, the role of the peer teacher is viewed as coming between the teacher and the students (Figs. 3A, 3B). The teacher does not have direct contact with the students, but the peer teacher is the one connecting these. In one of the sketches (Fig. 3B), a bi-directional arrow was drawn between the students and the teachers, and the peer teachers were clearly located in between the students and teachers. The following examples represent the category:

[Figures 3a and 3b]

Category 3. Peer teachers as students (2017 N=6, 2018 N=5)

In category 3, the peer teachers are viewed as being part of the student group (Figs. 4A, 4B). Peer teachers are not in between the teachers and the students, nor are they part of the teacher group, but are clearly viewed as students, separate from the teacher. Peer teachers do not have any special role which would differentiate them from other students. The following figures represent this category:

{figures 4a and 4b }

Subcategory 3.1 Peer teachers as supporters (2017 N=9, 2018 N=5)

In subcategory 3.1 the peer teachers are viewed as students, similar to the main category 3. (Figs. 5A and 5B). They are not in between the teachers and the students and are separate from the teachers. However, they have a specific role differentiating them from the other students: they are viewed as student supporters based on their location close to the students and based on the text in the drawings describing peer teachers as supporting or motivating students, which are the more active agents. The following examples describe the category:

[Figures 5a and 5b]

Category 4. Peer teachers as teachers (2017 N=1, 2018 N=7)

In category 4, the peer teachers are not viewed as being either students nor as being between students and teachers. Instead, peer teachers are viewed as teachers (Fig. 6), being located apart from students in a similar position to teachers. The peer teachers were shown to have an independent and separate teaching role, or they were placed amongst the teachers sharing the same role in the sketches. The following example represents the category:

[Figure 6]

Category 5. Peer teachers with multiple roles (2017 N=2, 2018 N=6)

In this category, peer teachers are described with multiple roles (Fig. 7). They are viewed in at least two of the roles described above, for example, as a teacher and as part of the student body. The following sketch represents the category:

[Insert Figure 7 about here]

Discussion

The aim of this study was to explore the relationship between peer teacher support and students' integration, including student and teacher interaction and support, as well as students' identification as being part of the programme. In addition, the aim of the present study was to explore how students experienced the effect of peer teachers in their integration into the programme and how they experienced and visualised the communality in the programme.

Our first research question explored the relationship between students' experiences of peer teaching and their relation to students' integration including experiences of teacher interaction and support, student interaction, and identification with the programme. The quantitative results showed that students' experiences of peer teacher interaction and support were very positive in both years studied (mean=4.65). In addition, the peer interaction and support were positively related to students' identification with the programme. This result is in line with earlier research which has shown that peer-to-peer teaching can lead to better student engagement in study at university (Stigmar, 2016) and is positively related to students' sense of communality and belonging (Fougner, 2013). In addition, student experiences about peer teacher interaction and support were also positively related with student interaction and support. This is in line with earlier research which has shown that students receiving peer tutoring can experience better interaction with fellow students compared to students who do not receive peer tutoring (Buraphadeja & Kumnuanta, (2011). Our results also showed that students' experiences of peer teacher interaction and support are related to experiences

of teacher interaction and support. Thus, it seems that peer teaching also affects the teacher-student relationship positively.

Our second research question asked how the students experience the effect of peer teachers on their integration into the programme. According to the open-ended answers, peer teachers were viewed as supporting the integration into the programme in several ways. Only one student out of 40 had a negative experience about the peer teachers' effect on integration and two students did not see a connection. All the other students saw the effect as being positive. This is in line with earlier research as peer tutoring has been found to have positive effect on students' sense of communality and belonging (Fougner, 2013). In both years, most of the students felt that peer teachers shared a lot of important information that helped students. There were also many experiences related to the peer teachers which reflected elements of communality. Many students felt that the peer teachers helped their integration because they were easy to relate to, had a student point of view and created a good atmosphere in the course. These views were especially emphasised in 2018. These results can be linked to earlier research, which has shown that the atmosphere in peer-to-peer teaching can be more relaxed than in a traditional teaching situation (Wakefield & Gregorius, 2012). It has also been shown that peer tutoring can influence students' sense of communality and connectedness (Buraphadeja & Kumnuanta, 2011).

Our third research question explored how the students visualise the communality and peer teachers' role in the programme. In the sketches, peer teachers as mediators were emphasised the most in both years. Thus, the peer teachers' role was to be between the students and the teacher. Earlier research has shown that the peer teachers and the students share a similar knowledge base, which can help the students to learn better (Cornwall, 1980). Thus, acting as mediators and sharing knowledge, peer teachers may have supported students' understanding. Many of the students' sketches also emphasised the peer teachers' role as being more related to the students than to the teachers as many of the students' sketches showed peer teachers role as supporting the students or as being part of the

students. This also supports the assumption that students and peer teachers share a knowledge base and are closer to each other than teachers (Cornwall, 1980). In the sketches, elements of communality and good interaction between all the actors appeared. Many students also saw everyone as being equal actors or as an equal support network which also suggests that the interaction and communality is experienced. This is also in line with earlier research which shows that peer tutoring can have a positive effect on students' sense of communality and belonging in studies positively (Buraphadeja & Kumnuanta, 2011; Fougner, 2013).

Students' experiences with the peer teacher interaction and support differed between the students taking part the course in 2017 and 2018. In both years, the experiences were very positive, but the emphasis was on different aspects. The results showed that the experiences of peer teacher interaction and support were significantly higher in 2017 than in 2018. In addition, it seemed that students experienced the peer teachers' effect on communality a little differently. In the sketches, students in 2018 visualised the peer teachers' role more as being separate from students and closer to teachers than in 2017. In addition, more students in 2017 visualised the peer teachers as supporters compared to being students in 2018. However, based on the open-ended answers in 2018, students experienced the effect of peer teachers more as supporting the elements of communality. They saw that peer teachers were easy to relate to, having a positive effect and creating a good atmosphere in the course. More students in 2018 also viewed that peer teachers were influential in making the students part of the programme and helped them network. It seems that in 2017, students felt that peer teachers offered more support or help in their university studies than in 2018 when the peer teachers were seen more as teachers but supporting elements of communality. The reasons for these differences are hard to explain. We suggest that the students' need for support in 2017 from the peer teachers was connected to the educational reform at the University of Helsinki which was implemented in 2017 and obviously caused confusion within the study programme and was also experienced by the first-year students leading to the situation in which peer teachers were seen more as sources of information and support

than peers to network with. In addition, further research could be conducted to further and more closely understand these issues.

Limitations

Our study has a few limitations which should be considered. First, the number of students in our study was quite small, only 62 students in 2017 and 64 students in 2018 took part in the study. For quantitative analysis, this number is quite small when judging if these results could be generalised across other study programmes and courses. In this study, the sample was highly representative as almost all students responded to the questionnaire at the end of the course. In addition, we used a mixed method approach in this study in which we explained the quantitative results more closely with a qualitative analysis (Plano Clark & Creswell 2008, 466). Thus, our data gave a rich picture of students' experiences of the peer teaching. Furthermore, our data were collected from first-year students at the end of the first 7-week teaching period. We acknowledge that it has been shown that the feelings of belonging may decrease later as students progress through their university programme (Gillen-O'Neel & Fuligni, 2013). Future research should focus on long-term effects of peer teaching in the integration to studies.

Practical implication

According to our results, peer teaching can have a notable influence on student experiences of student and teacher interaction and support as well as identification with the programme. We consider peer teaching to be an excellent way to support students' integration into the university. Studies have shown that academic and social integration into the university is important for successful studying and persistence (Lähteenoja, 2010; Pascarella & Terenzini, 2005; Rautapuro & Väisänen, 2002; Tinto, 1975). Our results showed that peer teachers can support students' experiences of communality and integration in many ways. Peer teachers may support students' integration and experiences of communality by acting as mediators connecting the students and the teachers and by promoting

students' feelings of communality. Earlier research has shown that students' experiences of interaction and communality can vary considerably (Asikainen et al., 2018). We suggest that in addition to the peer teaching activities that are given to first-year students at the beginning of their programme, giving advanced students responsibility for teaching newcomers may better promote students' integration into the university. Earlier research into Lesson study plans concerning the collaborative planning of teaching and involvement in students in curriculum and programme planning (Warwick, Vrikki, Vermunt, Mercer, & van Halem, 2016) is one example of how to involve students in the planning of teaching. The lesson study process has been found to foster better collaboration and promote better student learning (Roback, Chance, Legler, & Moore, 2006). In light of our results, we argue that not only involving students in planning of teaching, but also giving responsibility to peer teachers further promotes better interactions between students and teachers and integration in higher education.

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Table 1. Characterisation of the students taking the orientation course in the bachelor's programme in environmental sciences at the University of Helsinki in 2017 and 2018.

	Enrolled students	Female	Male	Average age (years)	Median age (years)	Minimum age (years)	Maximum age (years)
2017	62	55	7	22	20	18	39
2018	64	55	9	22	21	18	37

ble 2. Factor loadings of the scales measuring student integration

Items	F1	F2	F3	F4	α
Since starting my studies in this programme, I have developed close personal relationships with other students.	.991	-.124	-.121		.894
The student friendship I have developed have been personally satisfying	.930				
It has been difficult for me to meet and make friends with other students	-.726				
My interpersonal relationships with other students have had a positive influence on my intellectual growth and interest in ideas.	.646	-.129	.106	.225	
Few of the students I know would be willing to listen to me and help me if I had a personal problem.	-.587	-.134			
I have been satisfied by my opportunities to meet and talk with the teachers in this programme.		.899	.138		.827
The teachers in this programme I have met are ready to spend time with students outside the lectures by discussing things that are interesting and important to us students.		.690			
The teachers support and encourage me in my studies.		.649		.167	
My study programme is important for me			.819		.725
It's great to be a student in this study programme		.144	.621		
I does not matter much which programme I study in			-.536		
I am proud to be a student in the bachelor's programme of environmental studies.	.150		.488	.267	
I feel a part of the bachelor's programme of environmental sciences	.166		.400	.344	
The peer teachers support and encourage me in my studies.				.874	.831
The peer teachers are ready to spend time with students outside the lectures by discussing things that are interesting and important to us students.			-.139	.735	
Peer teachers are interested in students.		.218		.468	
I have been satisfied by my possibilities opportunities to meet and talk with the peer teachers in this programme.	.217	.233		.379	

Table 3. The correlations between the sum of the variables

Scales	SID	TI	PI
SID Students' identification as part of the programme	1		
TI Teacher–student interaction	.29**	1	
PI Peer teacher-student interaction	.32**	.61**	1
SI Student interaction	.43**	.38**	.53**

Table 4. The One-way ANOVA analysis comparing students' experiences in 2017 and 2018.

Scales	All		2017		2018		F	p	d
	m	sd	m	sd	m	sd			
SID Students' identification	4.65	0.44	4.64	0.45	4.66	0.42	0.06	.813	-0.04
TI Teacher–student interaction	3.98	0.72	4.01	0.69	3.94	0.72	0.29	.590	0.10
PI Peer teacher-student interaction	4.17	0.73	4.35	0.45	3.99	0.64	7.36	.008	0.65
SI Student interaction	3.98	0.83	3.88	0.94	4.09	0.68	1.83	.178	-0.26

Table 5. The distribution of the categories

Dimensions	2017	2018
1 Sharing of information and experiences	38	26
1A Peer teachers as informants or advisers, sharing information and advice on the programme, studies and life as a student.	21	15
1B Peer teachers sharing their personal experience on studying.	17	8
1C Peer teachers give an example of how to study.	0	3
2 Peer support and help	14	7
3 Peer teachers inspiring, encouraging, motivating	4	6
4 Elements of communality	17	51
4A Peer teachers are easy to relate to and they have a student viewpoint.	9	17
4B Peer teachers are easy to approach and are available.	3	4
4C Peer teachers have a positive effect, they are nice and create a good atmosphere in the course	3	19
4D Peer teachers take students as part of the group, programme and help networking	2	11
5 Neutral of negative experience of peer teaching	3	3
5A No advantage nor disadvantage, neutral	2	2
5B Negative experience/effect	1	1

Table 6. The categories of the open-ended answers and their different dimension.

Category	1 Sharing of information and experiences	2 Peer support and help	3 Peer teachers inspiring, encouraging, motivating	4 Elements of communality	5 Neutral of negative experience of peer teaching
Core theme	Peer teachers as important source of information, advice or experiences, flow of information one-way	Peer teachers as peer support, helping when needed. Emerging interaction between peer teacher and student.	Peer teachers motivate and encourage students. They are enthusiastic and inspire students.	Peer teachers create a good atmosphere by being approachable, and by being encouraging and inspiring students. Peer teachers help students to network and become part of the community.	Peer teaching viewed neutral or having negative elements
The role of the peer teacher	Informant and sharing experience	Supporter	Inspirer, motivator, encourager, enthusiasm	Equal	Neutral or not mentioned
The role of the student	Recipient of information and experience	Enquirer, with questions or need of help, recipient of help	Recipient of encouragement, enthusiasm and motivation	Community member	Not interpretable
Dimensions	1A Peer teachers as informants or advisers, sharing information and advice on the programme, the workforce, studying and life as a student.	2A Peer teachers as peer support. They help and support students.	3A Peer teachers are enthusiastic, encouraging and inspiring, they motivate students.	4A Peer teachers are easy to relate to and they have a student viewpoint.	5A No advantage nor disadvantage, neutral
	1B Peer teachers sharing their personal experience on studying.			4B Peer teachers are easy to approach and available.	5B Negative experience/effect
	1C Peer teachers give an example of how to study.			4C Peer teachers have a positive effect, they are nice and create a good atmosphere on the course	
				4D Peer teachers take students as part of the group, programme and help networking.	

Table 7. The categories representing student sketches

Category	2017	2018	Criteria
1. Everyone as equal actors	6	6	<ul style="list-style-type: none"> - The agents are in equal relationship with each other in a placement, not expressing any differences between the roles (for example in line with each other, in a circle) - The interpretation of the sketch would not change if the agents switched places
1.1 Peer teachers as part of an equal group supporting the role "me"	5	-	<ul style="list-style-type: none"> - ME at the centre, all other agents equally supporting. - The interpretation of the sketch would not change if the agent's teacher, peer teacher and student would switch places i.e. all agents expect the student him- or herself
2. Peer teachers as mediators	11	11	<ul style="list-style-type: none"> - The teachers do not have direct contact with the students - The peer teacher is situated in between of teachers and students
3. Peer teachers as part of students	6	5	<ul style="list-style-type: none"> - The teachers do not have direct contact with the students - Peer teachers are not in between teachers and students but are part of the student group with no direct relation with the teachers
3.1 Peer teachers as supporters	9	5	<ul style="list-style-type: none"> - The teachers do not have direct contact with the students - Peer teachers are not in between teachers and students but have a different supporting role from the students based on location or text/drawings
4. Peer teachers as teachers	1	7	<ul style="list-style-type: none"> - Peer teachers are not part of the student body or between students and teachers - Peer teachers are separate from students and next to the teacher - Peer teachers have an independent teaching role or have a similar role with teachers
5. Peer teachers with multiple roles	2	6	<ul style="list-style-type: none"> - Peer teachers have multiple roles

Figure 1A, Figure 1B Examples of the sketch belonging to the category *Everyone as equal agents*.
 Yellow=peer teacher, green=me, pink=teacher, orange=student. The quote in the Figure1A: “Everyone as equal members of the university community”

Figure 2. Example of the sketch representing *Peer teachers as part of equal support network*.
 Yellow=peer teacher, green=me, pink=teacher, orange=student. Quotes in the figure: "We are all in the same
 "boat" ", "Always helping and giving advice", "Help", "Advice", "Knowledge", "The support group around
 me"

Figure 3A, Figure 3B Examples of the sketch representing *Peer teachers as mediators*. Yellow=peer teacher, green=me, pink=teacher, orange=student. Quotes in the figure 3B: "Primary support, so called "messenger", "Secondary, can still be directly approached"

Figure 4A, Figure 4B. Example of the sketch representing *Peer teachers as part of students*.
 Yellow=peer teacher, green=me, pink=teacher, orange=student. The left circle side represents students ("opiskelijat") and the circle on right side represents teachers ("opettajat")

Figure 5A, Figure 5B. Examples of the sketch representing Peer teachers as supporters. Yellow=peer teacher, green=me, pink=teacher, orange=student. In the Fig. 5B there is an arrow indicating flow of support (“tukea”) from the peer teacher to the role ‘me’.

Figure 6. Example of the sketch representing *Peer teachers as teachers*. Yellow=peer teacher, green=me, pink=teacher, orange=student. The arrows from the teachers and the peer teacher represent the flow of information (“Tietoa”).

Figure 7. Example of the sketch representing *Peer teachers with multiple roles*. Yellow=peer teacher, green=me, pink=teacher, orange=student. In this example, peer teachers are represented partly as teachers and partly as students. The dotted line connecting the dual roles of peer teachers is labelled “peer teachers as ‘interpreters’ and links between different levels of hierarchy.”