Abstract

Background: To support students' motivation towards constructive and persistent study efforts, their learning environment needs attention.

Aim: To develop knowledge about occupational therapy students' perceptions of the learning environment and assess whether identified differences between education programs were stable or changed across the three years of study.

Methods: Norwegian occupational therapy students completed the Course Experience Questionnaire (CEQ) while in their first, second and third years of study. Differences between programs were analyzed with multivariate and univariate analysis of variance.

Results: Among the first-year students, perceptions of the learning environment differed significantly between the six programs on five out of six scales. Apart from a continued difference on overall study satisfaction, the initial differences were no longer significant one year later. Differences on three scales (emphasis on independence, appropriate workload and generic skills) were present in the third year of study.

Conclusions and significance: Students' perceptions of the learning environment became more similar over time, during the first two years of study, possibly reflecting that the students have become more accustomed to the student role and to the culture and requirements of the education programs. However, differences between study sites re-occurring in the third year suggest that group-based comparisons of learning environment perceptions across time may be inconclusive.

Keywords: higher education, learning environment, students,

Background

The learning environment refers broadly to the perceived curriculum, instructions and assessments in a given line of study. It has been proposed to influence students' motivation [1], their levels of self-beliefs and self-regulatory capabilities [2] and learning outcomes [3]. A well-functioning learning environment promotes students' use of deep and strategic approaches to learning [4,5], and in turn, students' approaches to learning have been associated with academic performance in a vast amount of research [e.g., 6,7-10]. The students' possibility of choice and autonomy, and the teachers having clear expectations as well as an interest in and concern for the students, are also factors related to student achievement [4,11].

Current trends in teaching lean towards creating a student-active learning environment such as flipped classroom, case-based, inquiry-based, and team-based learning [12]. Student-active teaching methods not only aim to facilitate learning, but rely on students actively preparing for, taking part in and engaging in lectures and seminars. In addition to placing more demand on students' readiness to engage, the use of student-active teaching methods also calls for educators to change their teaching methods towards actively motivating and engaging the students [13,14], e.g. through feedback that is contingent on the students' needs [15]. Feedback from students about their experiences with and assessment of different aspects of the learning environment can and should inform strategies for changes in the learning environment in order to enhance the quality of education programs [16-18].

In Norway, there are six occupational therapy educational programs, all with a duration of three years leading to a bachelor's degree. While the six programs are similar with regards to the use of occupational therapy theories, central concepts and total time in clinical placement, the distribution of placement periods differs across the education programs. All programs have learning outcomes consistent with the standards of the national

qualification framework [19]. Yet, the educational programs are also adapted to local and regional needs and resources. Accordingly, the programs differ in terms of e.g. admission requirements, number of students and time and duration of clinical placement, especially during the 1st year (see Table 1). A recent study showed that the learning environment accounted for 42 % of the variation in occupational therapy students' satisfaction with the education programs in Norway [18]. Thus, if there are systematic differences in perceptions of the learning environment between education programs, such differences may evoke very different experiences of the education programs altogether.

In 2017, an advisory board of occupational therapy educators, students and practitioners began forming a new national curriculum regulation for occupational therapy education programs, to be applied in each program from 2020 [20]. Thus, all occupational therapy programs in Norway are currently undergoing changes, albeit to different degrees, and will continue to change over the next 3-5 years. The explicit aim of the national reform is to standardize the competences achieved from undergoing occupational therapy education in Norway, by aligning the overarching learning outcomes across all education programs. The reform of the occupational therapy curricula occurs in context of similar changes for all health- and social care education programs in the country. Aligning the overarching learning outcomes was initiated as a means to increase the quality and relevance of the education programs [21].Whether or not the ongoing process leads to more similarity in the learning environments at different education institutions is yet unknown.

Currently, we know little about the degree to which Norwegian occupational therapy students' perceptions of the learning environment are similar or different between education programs, nor whether students' perceptions change during their time in education. Substantial and systematic differences between the six programs related to the learning environment might indicate unequally distributed potentials for student development and

satisfaction [22]. This is of interest in the context of the ongoing revision of education programs in Norway and may also be relevant for other countries steering towards the alignment of multiple education programs. Alignment, or coherence, between education institutions is an important issue and is also vital for the students' experience within a particular study program. Canrinus and co-workers [23] found, that students in a program explicitly oriented towards coherence between different aspects of the curriculum reported high levels of connections across the program courses, including clinical placement. Students are an important and reliable source of feedback [24] and their experiences are highly relevant for developing coherent programs for future use in occupational therapy education.

Study aims

The aims of the current study were (i) to develop knowledge about occupational therapy students' perceptions of the learning environment in six education programs in Norway and (ii) to assess whether identified differences in perceptions of the learning environment between students at different education programs were stable between the first, second and third year of study.

Methods

Design and study context

The study is part of a longitudinal inquiry into approaches to studying and perceptions of the learning environment among occupational therapy students in Norway. For the present study, three cross-sectional analyses employed data from students while in their first, second and third years of study. The data collection was conducted on three occasions, with one-year interval, at each of the education programs, between December 2017 (end of first term) and February 2020 (early in the sixth term).

Participants, recruitment and response rate

At each of the six education programs, occupational therapy students in the cohort beginning their studies in the autumn of 2017 were invited to participate. A member of the faculty distributed the questionnaires and consent forms to students at a designated time. From the six education programs, 305 students were eligible participants. Of these, 187 students (response rate 61.3 %) participated in the first study year, 168 (response rate 54.1 %) participated the second year, while 200 (response rate 65.6 %) participated the third year. See further details on response rate for each education program in tables 2-4. Due to some dropout from the programs, the response rates may be somewhat underestimated.

Measurement

The learning environment

The original *Course Experience Questionnaire* [25] consists of 30 items distributed onto five scales: clear goals and standards, emphasis on independence, good teaching, appropriate workload, and appropriate assessment. In addition to the 30 items, one item assesses the students' general satisfaction with the course. Subsequently, a 37 items long version of the CEQ has been established [26-28], including a sixth scale concerned with generic skills. The validated Norwegian translation of the long version [29] was used in the present study. Higher ratings on the scales indicate that the respondent perceives the course to have: (1) clearly established and disseminated goals; (2) high levels of student autonomy and independence; (3) teaching that engages and involves the students; (4) a workload that is not too high; and (5) assessment forms that promote and support learning, and to (6) support the transfer of content knowledge and skills to the relevant work context. In the current study, internal consistency measures (Cronbach's α) were 0.73 (clear goals and standards), 0.63 (emphasis on independence), 0.70 (good teaching), 0.69 (appropriate workload), 0.45 (appropriate assessment), and 0.83 (generic skills). In view of the internal consistency results [30], the 'appropriate assessment' items were not used in the analyses.

Sociodemographic background and education-related variables

In addition to the CEQ, information regarding demographics (age and gender) and education (prior higher education and time spent self-studying during a normal week) was collected as part of the questionnaire.

Data analysis

All data were entered into the computer program IBM SPSS for Windows, version 24 [31]. Descriptive analyses were performed on all variables using means (*M*), standard deviations (*SD*), frequencies and percentages as appropriate. Differences on background variables between students enrolled at different education programs were investigated with Chi-square tests for categorical variables and with multivariate and univariate analyses of variance for continuous variables. In the multivariate analysis of variance (MANOVA), we controlled for background variables (age and time spent on independent studying) on which the students at the six education programs differed. In the case of a statistically significant multivariate effect of education program, a series of univariate analyses of variance (ANOVAs) were conducted to examine whether students at the different programs differed systematically with regard to their ratings on each of the CEQ scales. In cases of statistically significant ANOVA results, post-hoc analyses using the Bonferroni correction were conducted to identify the nature of the differences. The level of statistical significance was set at $p < 0.05$.

Ethics

Approval for collecting, storing and utilizing the data was granted by the Norwegian Center for Research Data (project no. 55875). The students were informed that completion of the questionnaires was voluntary, that their responses would be treated in confidence, and that there would be no negative consequences from opting not to participate in the study. Written informed consent was provided from all participants.

Results

Characteristics of the first-year students

The participants' characteristics at the time of first recruitment are shown in Table 1. Across the six education programs, 187 students in total completed and returned the questionnaires. The students in Oslo had the highest mean age, and they were significantly older than students in Trondheim ($p < 0.01$) and Sandnes ($p < 0.01$). The groups of students spent different amounts of time on self-study. During a typical week, the students in Gjøvik spent the highest mean number of hours on self-study, representing significantly more time than the time spent by all other students (all $p \leq 0.01$), except from the students from Bergen (*ns*). The students in Bergen spent significantly more time on self-study compared to the students in Trondheim ($p < 0.05$). Otherwise, differences between the groups of students were not statistically significant.

TABLE 1 ABOUT HERE

First-year students' perceptions of the learning environment

The mean CEQ scale ratings for all first-year students, and for each of the program-specific subsamples, are shown in Table 2. There was an overall effect of education program on the students' ratings on the CEQ scales (Pillai's Trace = 0.56, F [30, 830] = 3.46, $p < 0.001$, partial $\eta^2 = 0.11$), whereas age and time spent on independent studying were not significantly associated with the ratings. Subsequent univariate ANOVAs revealed that ratings on the 'clear goals and standards' scale did not differ significantly between programs, while there were significant overall differences between the programs related to all of the other learning environment scales. Regarding the 'emphasis on independence' scale, the students in Trondheim had a significantly higher mean rating compared to the students in Gjøvik ($p < 0.01$). On the 'good teaching' scale, students in Tromsø had higher rating than the students in

Bergen ($p < 0.05$), Sandnes ($p < 0.05$), and Gjøvik ($p < 0.001$). Students in Trondheim also had significantly higher rating on this scale compared to students in Gjøvik ($p < 0.001$). Regarding the 'appropriate workload' scale, the students in Bergen had a significantly lower mean rating than the students in Trondheim ($p < 0.01$) and in Tromsø ($p < 0.05$). On the 'generic skills' scale, students in Trondheim had significantly higher rating compared to the students in Gjøvik ($p < 0.05$), and similarly, students in Tromsø had significantly higher rating than the students in Gjøvik ($p < 0.05$).

On the one-item study satisfaction scale, assessing the students' overall satisfaction with the quality of the education programs, students in Gjøvik had significantly lower rating than students in Oslo, Trondheim, Sandnes (all $p < 0.001$) and Tromsø ($p < 0.01$). Similarly, the students in Bergen had significantly lower ratings compared to the students in Oslo, Trondheim and Sandnes (all $p < 0.05$).

TABLE 2 ABOUT HERE

Second-year students' perceptions of the learning environment

The students' ratings on the CEQ scales while in their second year of study are displayed in Table 3. There was an overall effect of education program on the students' CEQ ratings (Pillai's Trace = 0.37, F [30, 580] = 1.54, $p < 0.05$, partial $\eta^2 = 0.07$), whereas age and time spent on independent studying were not significantly associated with the ratings. Subsequent univariate ANOVAs revealed that most of the scale ratings were not significantly different between the education programs. Only the overall study satisfaction scale revealed a significant difference ($p < 0.05$). The pairwise comparisons showed that students in Trondheim ($M = 3.9$, $SD = 0.9$) had higher ratings on this scale, compared to students in Bergen ($M = 3.1$, $SD = 1.1$, $p < 0.05$). Otherwise, no pairwise differences occurred.

TABLE 3 ABOUT HERE

Third-year students' perceptions of the learning environment

The third-year students' CEQ ratings are displayed in Table 4. There was an overall effect of education program on the students' CEQ ratings (Pillai's Trace = 0.35, F [30, 915] = 2.71, $p < 0.001$, partial $\eta^2 = 0.07$), whereas age and time spent on independent studying were not significantly associated with the ratings. Subsequent univariate ANOVAs revealed significant differences between the education programs on three scales. On 'emphasis on independence', the students in Bergen had significantly higher ratings than the students from Oslo ($p < 0.001$), Trondheim ($p < 0.01$) and Tromsø ($p < 0.05$). On 'appropriate workload', the students in Tromsø had significantly higher ratings than the students in Oslo ($p < 0.01$) and Trondheim ($p < 0.01$). While the omnibus test for differences on 'generic skills' was statistically significant, no pairwise differences were revealed. Differences on 'clear goals and standards', 'good teaching' and 'study satisfaction' were not significantly different between the students in the six education programs.

TABLE 4 ABOUT HERE

Discussion

Perceptions of the learning environment differed significantly between first year occupational therapy students enrolled in the different education programs in Norway. Significant differences were found in the first-year students' age, as the students in Oslo and Tromsø had the highest mean age and students from Gjøvik reported spending considerably more time on self-studying, compared to students at other education programs (Table 1). However, as age and time on independent study were not significantly associated with the CEQ scales in the multivariate analysis, these differences do not contribute to the understanding of the differences in learning environment perceptions between students at the six education programs.

Although the students in Gjøvik did spend more time on self-study they did not rate their workload as significantly less appropriate compared to students at any of the other programs. This paradox may indicate that hours spent on self-studying are largely regulated by the students' intrinsic motivation. Self-motivated and self-organized efforts may add less to the perceived workload compared to externally imposed tasks. More hours spent on independent studying may also be a result of experiencing little autonomy in the teacher-organized parts of the course, as might be interpreted from the low rating on 'emphasis on independence' by the students in Gjøvik (see Table 2).

While the students were in their second study year, the differences between the six education programs had ebbed out, except for overall study satisfaction. Several factors may have contributed to the second-year students perceiving the programs as more similar. Some cooperation between the occupational therapy education programs in Norway has existed for several years; for instance by initiatives to establish joint learning outcomes [32] and joint efforts in making clinical placements compatible. These aspects of the programs may have become more tangible for the students as they had progressed to their second year of study.

Moreover, the students may have developed towards a more similar understanding of their role as students, and thus have developed towards a more similar view of the learning environment in the study programs during the same period. Importantly, at this point in their study program, all students have more experience from clinical placement (Table 1). Clinical experience may lead students towards a more unified perception of the generic skills developed in the program, since all the OT education programs in Norway are hitherto based on a common minimum base for generic skills at graduation. This interpretation emphasizes habituation and indicates that students' perceptions of the learning environment may gravitate towards a common mean value between the first and second year in the program [33].

Group differences (on ‘emphasis on independence’, ‘appropriate workload’ and ‘generic skills’) were again present among the students while in the third year of study. We are unaware of group comparisons similar to ours that can serve as a direct point of reference for these results. The individual-level analyses presented by Dunham and co-workers [34] revealed that medical students generally experienced a decline in learning environment ratings across their time in study, and that the decline was worsened during the time the students were introduced to clinical placement. In the current study, group differences were found to be inconsistent over time. However, a relatively unchanged group mean rating can conceal different change patterns for different individuals within the group. Moreover, group ratings becoming more similar can also conceal a variety of individual change patterns. Such individual changes are not accounted for in the current study.

In view of the inconsistent pattern of group differences, it appears that consecutive cross-sectional group comparisons are not ideal for investigating students’ learning environment perceptions. Cross-sectional comparisons at a given point in time may be warranted in cases where group differences might be expected and potentially explained. However, as this study has shown, group differences may vary over time and interpretation of the group-level pattern of change may be difficult. Instead, future studies analyzing changes in individual students’ perceptions of the learning environment, and predictors of such change, are highly recommended. The ongoing process of implementing new curriculum regulations on a program level make the current study an interesting baseline for future studies

Study strengths and limitations

The sample was modest in size, and the response rates varied somewhat between the first, second and third time of data collection, with the highest response rate at the last measurement. At all three measurement points, however, the response rate exceeded 50 % of

the eligible sample [35]. General population surveys often obtain substantially lower response rates (about 30-40 %), and comprehensive surveys administered to occupational therapy practitioners have obtained similar rates [36]. While recent research on occupational therapy students have reported somewhat higher response rates in studies from the USA (74 %)[37] and Australia (74 %),[38], obtaining high response rates tend to be more difficult in studies using follow-up measurements. Thus, we consider the overall response rate in this study to be satisfactory.

Self-selection to participate in the study introduces a possible selection bias. Those who opted to participate may have had different attitudes and perceptions (e.g., more motivated, perceiving the learning environment as more positive) compared to non-participants. In addition, a social desirability bias was possible – for example, participants may have considered some responses desirable and others not and may have been inclined to respond according to this perception. Another limitation is the single nation context. The results of this study may not be generalizable to other countries and educational contexts.

The data collection procedure, which included three subsequent measurement occasions, moved the field of study beyond those of previous studies merely comparing cohorts of students [39,40] and allowed for the assessing the stability of group differences across time. However, the study did not address individual changes in perceptions of the learning environment across time.

Conclusion

The aims of this study were to develop knowledge about occupational therapy students' perceptions of the learning environment in the education programs in Norway and assess whether identified differences were stable or changed across time. While in the first year of the study program, we found that the students' perceptions of the learning environment differed between the six education programs on five of six scales. When the students were in

their second study year, a difference was retained on the study satisfaction scale, while group differences on three scales occurred among the students while in the third study year. Yielding differences indicate that students' perceptions of the learning environment across study sites may become more similar during the first period of the students' time in the education program. However, the interpretation of unstable group differences across time is difficult. One way forward may be to incorporate qualitative data (student interviews) into a mixed-methods research design, supplementing survey-based data. Alternatively, future studies may seek to analyze changes in individual students' perceptions of the learning environment and predictors of such change.

Conflict of interests

The authors declare that they have no competing interests.

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Table 1

Grade point average requirements, time in placement and demographic characteristics of the first-year students by education program

		Education program						
Characteristics	All	Oslo	Bergen	Trondheim	Sandnes	Tromsø	Gjøvik	*p*
Age (M [SD])	22.9 (4.6)	25.8 (6.9)	22.8 (4.6)	22.0 (1.9)	21.5 (3.3)	24.3 (7.1)	22.5 (3.0)	< 0.01
Female gender (n [%])	149 (80.1)	19 (79.2)	28 (84.8)	43 (78.2)	27 (87.1)	16 (66.7)	16 (84.2)	0.48
Prior higher education (n [%])	78 (41.9)	12 (50.0)	17 (51.5)	25 (45.5)	11 (35.5)	9 (37.5)	4 (21.1)	0.28
Time spent on self-study (M [SD])	9.3 (7.0)	9.2 (6.3)	11.6 (8.4)	7.3 (3.9)	7.0 (3.4)	8.9 (9.2)	16.1 (8.3)	< 0.001
Grade point average for admission		47.0	46.5	44.2	43.8	50.6	44.3	
Total clinical placement 1st year		3 days	38 days	15 days	20 days	43 days	45 days	
Total clinical placement 2nd year		100 days	55 days	60 days	80 days	50 days	60 days	
Total clinical placement 3rd year		50 days	55 days	65 days	80 days	53 days	65 days	

Note. Statistical test of differences is ANOVA *F*-test for age and time spent on self-study, and χ^2 for gender and prior higher education. *M*: Mean; *SD*: Standard Deviation. P-values indicate the probability of overall differences between the groups of students. Prior higher education indicates the number/proportion of students who reported having higher education prior to starting their current line of study. Time spent on self-study indicates the number of hours spent during a typical week.

Table 2

The first-year students' perception of the learning environment: Scale ratings by education program

		Education program						
CEQ Scales	All	Oslo	Bergen	Trondheim	Sandnes	Tromsø	Gjøvik	*p*
Clear goals and standards	16.6 (3.9)	17.2 (4.0)	15.6 (4.1)	16.7 (4.4)	16.7 (3.5)	18.0 (2.5)	15.1 (3.7)	0.11
Emphasis on independence	18.6 (4.2)	17.6 (3.7)	18.2 (4.4)	20.1 (3.5)	18.8 (3.9)	19.0 (4.5)	15.8 (4.6)	< 0.01
Good teaching	27.2 (6.2)	26.9 (5.0)	26.1 (6.3)	28.8 (5.6)	25.9 (6.1)	31.2 (4.5)	22.2 (7.2)	< 0.001
Appropriate workload	15.2 (3.7)	14.5 (3.6)	13.5 (3.6)	16.5 (3.3)	14.9 (3.2)	16.4 (3.9)	13.8 (4.1)	< 0.01
Generic skills	22.9 (4.1)	22.8 (4.4)	23.0 (3.6)	23.9 (3.5)	21.2 (4.3)	24.4 (3.2)	20.7 (5.8)	< 0.01
Study satisfaction	3.8 (1.1)	4.2 (0.9)	3.4 (1.1)	4.1 (0.7)	4.2 (0.9)	3.9 (1.0)	2.8 (1.3)	< 0.001
Response rate	61.3%	31.6%	73.3%	72.7%	66.0%	100.0%	48.7%	

Note. CEQ is Course Experience Questionnaire. Table content is mean ratings (*M*) and standard deviation (*SD*). *P*-values indicate the probability of overall differences between the students at the six universities, as indicated by the ANOVA *F*-test.

Table 3

The second-year students' perception of the learning environment: Scale ratings by education program

		Education program						
CEQ Scales	All	Oslo	Bergen	Trondheim	Sandnes	Tromsø	Gjøvik	*p*
Clear goals and standards	16.9 (3.2)	16.8 (3.3)	15.2 (2.8)	17.0 (3.3)	17.4 (3.2)	17.8 (2.8)	16.9 (3.4)	0.24
Emphasis on independence	18.0 (3.8)	18.1 (3.4)	18.4 (2.7)	17.9 (3.9)	18.2 (3.6)	16.6 (5.1)	18.4 (4.6)	0.79
Good teaching	25.1 (5.5)	25.3 (5.5)	22.6 (6.3)	25.8 (5.1)	24.9 (5.0)	25.0 (6.8)	25.5 (4.8)	0.45
Appropriate workload	15.3 (3.6)	15.2 (3.7)	16.2 (2.7)	14.4 (4.0)	14.6 (3.0)	17.0 (4.4)	16.4 (2.9)	0.07
Generic skills	23.7 (3.2)	23.4 (2.6)	24.5 (2.8)	23.9 (3.3)	22.4 (4.1)	23.5 (2.0)	24.6 (3.2)	0.21
Study satisfaction	3.7 (0.9)	3.9 (0.6)	3.1 (1.1)	3.9 (0.9)	3.6 (0.8)	3.6 (1.2)	3.8 (0.9)	< 0.05
Response rate	54.1%	40.8%	53.3%	68.8%	53.2%	70.8%	46.2%	

Note. CEQ is Course Experience Questionnaire. Table content is mean ratings (*M*) and standard deviation (*SD*). *P*-values indicate the probability of overall differences between the students at the six universities, as indicated by the ANOVA *F*-test.

Table 4

The third-year students' perception of the learning environment: Scale ratings by education program

	Education program							
CEQ Scales	All	Oslo	Bergen	Trondheim	Sandnes	Tromsø	Gjøvik	*p*
Clear goals and standards	17.1 (3.6)	16.0 (3.9)	17.5 (2.8)	17.0 (3.6)	17.8 (3.5)	18.1 (3.3)	17.2 (4.2)	0.18
Emphasis on	18.0 (4.7)	16.7 (3.8)	21.7 (7.7)	17.4 (3.6)	18.1 (4.6)	17.0 (3.3)	18.8 (3.8)	< 0.01
independence Good	26.0 (6.1)	25.1 (5.4)	27.4 (5.2)	26.3 (7.6)	25.8 (5.8)	27.7 (5.1)	24.7 (4.9)	0.40
teaching Appropriate	15.3 (4.0)	14.3 (3.9)	16.5 (3.7)	14.0 (4.0)	15.9 (4.0)	18.2 (3.4)	15.8 (2.9)	< 0.001
workload Generic skills	24.6 (4.6)	24.5 (3.1)	27.1 (9.3)	23.9 (3.5)	23.8 (3.9)	23.7 (3.0)	25.5 (2.9)	< 0.05
Study satisfaction	3.8 (0.9)	3.6 (0.9)	3.9 (0.9)	3.8 (1.0)	3.7 (1.1)	3.9 (0.7)	3.8 (0.7)	0.76
Response rate	65.6%	61.8%	53.3%	71.4%	63.8%	83.3%	61.5%	

Note. CEQ is Course Experience Questionnaire. Table content is mean ratings (*M*) and standard deviation (*SD*). *P*-values indicate the probability of overall differences between the students at the six universities, as indicated by the ANOVA *F*-test.