Academically engaged or not? An exploratory study on modelling and assessing the engagement of first-year students at a research-intensive university in Finland

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Abstract

The first study year is very decisive in terms of a smooth transition into and engagement with university education. The main goal of this study is to develop a multidimensional model for assessing student engagement and use it with first-year students in a research-intensive university in Finland. Based on theoretical modelling and three-step piloting, an online Nexus self-assessment questionnaire was designed and used to conduct an annual survey of first-year students from 2013–2018 in the target university. A total of 1936 first-year students from different disciplinary fields responded. Three different engagement clusters were observed, with each representing a very different student relationship with engagement and learning. Academically engaged students showed a very balanced relationship with academic orientation in terms of their studies and study-related communities, whereas non-academically engaged students revealed tendencies towards certain knowledge-seeking and task-avoidance behaviours. Loosely engaged students seemed to also have a shallower academic orientation and, in addition, a weaker relationship with study-related communities. The three identified engagement clusters were also distributed differently within disciplinary fields. As an implication of the study, the way in which academic teaching and learning communities at the studied institution can benefit from the engagement assessment results and offer more focused support to students is discussed.

Keywords**:** student engagement; first-year students; multidimensional engagement assessment; engagement clusters; disciplinary differences

Introduction

Engagement has become a widely used and researched concept for assessing student involvement and successful transition into higher education (Koljatic and Kuh 2001; Handelsman et al. 2005; Krause and Coates 2008; Kandiko Howson and Buckley 2017). From the point of view of transitions into or within higher education (Kyndt et al. 2017), the first year is very decisive in terms of smooth start and beginning one's studies. First-year students' previous experiences of, motives for and starting points when entering higher education and their ability to adapt to new practices and the academic teaching-learning community affect the success of their transition to and engagement in university studies (e.g. Tinto 1997, 2006; Zhao and Kuh 2004). Therefore, developing engagement assessment practices and tools, especially for the early stages of university studies, is an important aim of this study.

Previous engagement studies with first-year students have applied measurements where, among others, both academic and intellectual and student peer engagement or student-staff engagement scales have been utilised (Coates 2007; Krause and Coates 2008; Bowden et al. 2019). In order to better understand first-year students' engagement and experiences in general, the assessment tools should also pay attention to the transformational process that students begin to go through in their studies. This means that self-confidence, autonomy and critical thinking start to develop and form part of their expertise (Bovill et al. 2011). There are also previous studies that have highlighted possible problems or deficiencies with regard to how students approach learning (Nurmi et al. 2003; Lonka et al. 2008), and these have, so far, seldom been taken into account in the context of student engagement research in higher education. Research has mainly focused on positive engagement factors and not on the factors that disturb engagement (e.g. Trowler 2010). Therefore, in a comprehensive assessment of first-year students' engagement, the potential challenges and difficulties in terms of such engagement should be taken into consideration.

The main objective in this study is multidimensional modelling and the assessment of student engagement among first-year students in one research-intensive university in Finland. The aim is to bring together and gain a better understanding of the individual and social components of student engagement, as well as of the influence of certain disruptive factors on engagement. Based on a review of the research on engagement and learning, an engagement self-assessment measurement (called the Nexus self-assessment questionnaire) was developed for measuring engagement in first-year students in different disciplinary contexts in the target institution.

The research questions based on the modelled engagement framework are as follows:

1) What are the characteristics of student engagement based on the modelled framework and scales in the first year of higher education?

2) What kinds of personal orientations that enhance or hinder engagement are identified, and what predictors are connected to these engagement orientations?

3) What kinds of engagement clusters are identified based on the modelled framework, and what are the discipline-based differences/specificities?

4) What predictors are associated with engagement cluster membership in the first year?

Theoretical framework for engagement assessment model development

Dimensions and components of student engagement

Engagement and identity formation are seen here as closely intertwined in students' learning processes (Reid et al. 2008; Solomonides and Reid 2009; Nygaard et al. 2013), and self-confidence and transformation are defined within this connection as concepts for describing the learning and changes that students experience during their first year at university (see Fig. 1). Students' self-confidence generally includes belief in their positive achievements, persistence and the development of self-awareness and, specifically, perceptions of their own academic and intellectual abilities (Laird 2005). The notion of self-confidence introduces the possibility of positive identity development and transformation as a result of engagement in learning during the transition to university studies. Self-confidence, as referred to here, is a similar concept to that of self-esteem (Abouserie 1995), academic self-efficacy beliefs (Bandura 1997; Bartimote-Aufflick et al. 2016) and a positive self-concept (Stanton 1980).

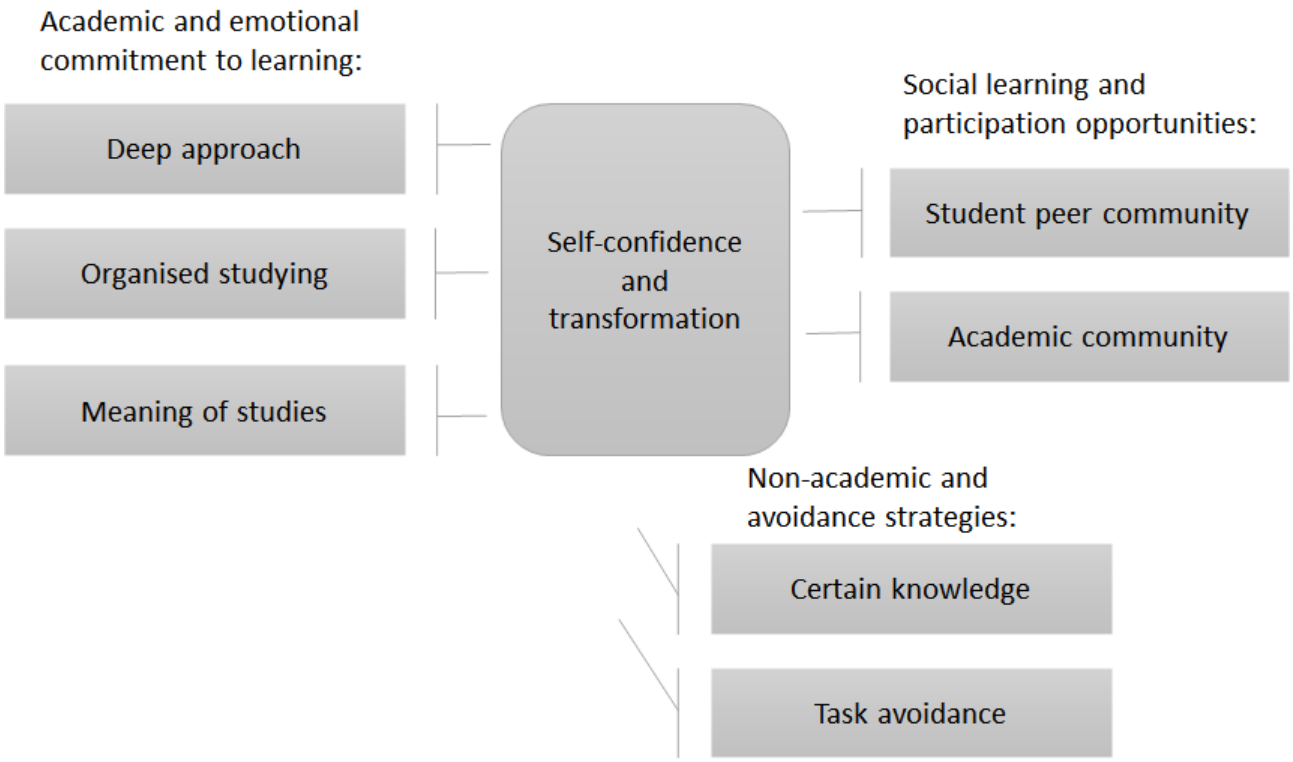

Figure 1. Composition of dimensions related to student engagement.

Self-confidence and transformation are influenced by academic and emotional commitment to learning (at the individual level) and social learning and participation opportunities (at the collective level). In this positive engagement process, both individual and social components are equally important (Krause and Coates 2008; Bowden et al. 2019). In addition, certain disruptive factors can negatively affect engagement during the first year of study, such as possible non-academic and avoidance strategies in a student's relationship to learning (Fig. 1). Therefore, this component is also considered along with engagement. In particular, different types of disruptive thinking patterns and habits, such as the avoidance of challenging tasks or simplistic epistemological conceptions (see Lonka et al. 2008), that arise during the first year or after a transfer from pre-university studies can create difficulties and yield a very superficial commitment to studies.

Academic and emotional commitment to learning as a trigger for engagement at the individual level

The first key dimension in academic and emotional commitment is the *deep approach to learning,* which particularly concerns the approach to academic study assignments. Research into approaches to learning lean heavily on Ference Marton's (Marton and Säljö 1976; Marton 1988) distinction between surface and deep learning strategies—in other words, on the student approaches to learning (SAL) tradition. Aspects of student learning in the SAL tradition are especially focused on cognitive strategies and motivation (e.g. Vermunt and Donche 2017). Students adopting the deep learning approach are internally motivated and have the intention of understanding and seeking meaning in the topics of their studies.

Another key dimension of academic and emotional commitment is *organised studying*, which is defined here as the importance of students' self-regulation skills, time management and goal-setting (Parpala et al. 2013; McCardle et al. 2017). This brings a metacognitive management perspective to academic and emotional commitment. Self-regulation is proven to be a central factor of a successful and productive studying process in several studies in diverse higher education contexts (Vermunt 2005; Haarala-Muhonen et al. 2011; Colthorpe et al. 2012), and self-regulated learners are shown to direct, monitor and adapt their academic and emotional commitment very effectively (Winne and Hadwin 2008).

As a third dimension in academic and emotional commitment, the *meaning of studies* is more broadly related to questions about the student's relationship with his/her studies and what kind of personal meaning such studies have for the student in relation to longer-term goals (Korhonen et al. 2017, 2019). The meaning of studies includes the aims, values and purposes of studying (Beaty, Gibbs, and Morgan 1997; Horstmanshof and Zimitat 2007), as well as the opportunities that these studies bring for students in the context of their personal lives (Korhonen et al. 2017, 2019).

Meaning of social learning and participation opportunities for engagement at the collective level

Social learning and participation opportunities with regard to both *student peer communities* and *academic teaching-learning communities* may create engaging learning experiences that accelerate stronger student engagement (Korhonen et al. 2017, 2019), and these form the key dimensions of social learning. Retention and continuation in studies have often been considered according to the classical conception developed by Tinto (1975, 1997), in which stronger engagement is achieved as a combination of social and academic integration. Social integration includes social relationships and contacts with students' peer communities, while academic integration encompasses issues related to academic and scientific activities and contact with teaching and research staff (see Tinto

1997). As Wenger (1998) defines it, participation is a process of being in relationships with others. While university studies often involve independent assignments, preparation for exams and attending mass lectures, it is also essential to participate in social practices in which academic knowledgeability can be developed in collaboration with other members of the community, whether in student peer communities or academic teaching-learning communities (e.g. Korhonen et al. 2017, 2019).

Non-academic and avoidance strategies as factors that disrupt engagement

Beliefs about knowledge and knowing affect how students' scientific thinking is expected to develop. The conceptions of knowledge and knowing are referred to as personal epistemologies or epistemological beliefs (Hofer and Pintrich 1997; O'Siochru and Norton 2014). Overall, when epistemological beliefs are limited by are stuck in *certain knowledge* preferences, this can create a barrier to the development of scientific understanding and reasoning in the student's own disciplinary and professional context, and produce an instrumental relationship with learning that further complicates engagement in studies (Hofer and Pintrich 1997; Lonka et al. 2008). This attitude towards knowledge has also been called a "cookbook" orientation (see Lonka et al. 2008), in which students' value more certain, concrete and practical knowledge and prefer teaching that provides them with well-designed recipe-like instructions. This preference may lead to superficial academic learning and difficulties in adapting knowledge to new contexts and problem-solving (Kaartinen-Koutaniemi and Lindblom-Ylänne 2008).

The second dimension of non-academic and avoidance strategies is *task avoidance*, which touches on the problem of procrastination in learning and which is understood to be caused by various problems in terms of self-regulation (Steel 2007; Rakes and Dunn 2010; Stewart et al. 2016). Task avoidance in assignments means delaying, waiting and leaving difficult things to the last minute, and it is related to lower levels of self-optimism (see Lonka et al. 2008). Task avoidance can be considered as related not only to experiencing helplessness or procrastination in the face of difficult tasks but also to performance-oriented goals in learning (Pintrich 2003). In tertiary education, in particular, students may develop an approach called performing learning that aims for success with very minimal effort and utilises non-desirable and maladaptive learning behaviours (see Liem, Lau, and Nie 2008; Stewart et al. 2016). This approach is very detrimental to stronger engagement in learning.

Materials and methods

Participants and principles of data collection

The Nexus self-assessment survey was conducted annually for first-year students from 2013–2018 in the target university. The questionnaire was sent as an online questionnaire to all students who have obtained positions as new students in the target university at the year being researched. The survey was conducted annually during the second half of the academic year. The data collection procedure followed a non-probability sampling method and was based on the self-selection and activity of the respondents. First-year students from all faculties belonged to the sample population.

Table 1. Participant demographic data.

Variable	f	%
Gender		
Female	1550	80.5
Male	375	19.5
Total	1925	100.0
(Missing)	(12)	
Age group		
–20	476	31.9
21–24	451	30.2
25–29	204	13.7
30–34	115	7.7
35–39	90	6.0
40–	157	10.5
Total	1493	100.0
(Missing)	(444)	
Disciplinary field		
Information and Computer Sciences	222	11.5
Management and Administrational Sciences	380	19.6
Education Sciences	402	20.8
Language, Translation, and Literary Studies	217	11.2
Biotechnology and Medical Sciences	138	7.1
Health Sciences	108	5.6
Communication Sciences and Theatre	76	3.9
Social Sciences	393	20.3
Total	1936	100.0
(Missing)	(1)	

A total of 1936 first-year students responded to the survey over a six-year period (Table 1), with annual responses varying between 251 and 386 respondents. The response rates during the data collection years varied between 10.9% and 25.3%. The response rate declined towards the end of the research period, while the student intake numbers increased yearly. In the questionnaire, the respondents were asked to directly record their age in numerical form, but 444 respondents left the age section unmarked (Table 1). In this case, choosing from age categories might have been a faster and more productive option, even if the age variable had been limited to a categorical variable.

Measurement

Theory-driven modelling guided the operationalisation of the Nexus instrument. Many previously known and validated measures, which were mainly focused on learning-related issues, such as LEARN/HowULearn (Parpala et al. 2012, 2013) and ETLQ/ASSIST (Entwistle et al. 2003; McCune and Hounsell 2005), were utilised in the development of the specific dimensions and scales of the Nexus self-assessment questionnaire for engagement. In addition, the Nordic Medical Students' Well-being and Study Orientation (MED NORD) measurement (Lonka et al. 2008) and the Inventory of General Study Orientations (IGSO) (Mäkinen et al. 2004) were utilised in the development of the Nexus instrument (Table 2). Predefined or translated versions from other Finnish researchers (Parpala et al. 2012; Lonka et al. 2008; Mäkinen et al. 2004) were mostly used for the items, and some individual items were designed by the original project group (Törmä et al. 2012).

Table 2. Nexus questionnaire 39-item version scales, example items and reliability coefficients.

Theory-based dimensions/scales	Scale reliability 2013–2018 α
Academic and emotional commitment	
Deep approach 5 items from HowULearn /ETLQ/ASSIST *"I usually set out to understand for myself the meaning of what we have to learn"*	0.73
Organised studying 6 items from HowULearn /ETLQ/ASSIST *"I organise my study time carefully to make the best use of it"*	0.81
Meaning of studies 4 items: 3 from IGSO, MED NORD; 1 self-defined item *"My study programme is just right for me"*	0.82
Self-confidence and transformation 6 items: 2 from MED NORD, 4 self-defined items *"University is stimulating my enthusiasm for further learning"*	0.83
Social learning and participation	
Academic community 5 items: 2 from HowULearn /ETLQ/ASSIST, 3 self-defined items *"The feedback from the courses helps me to clarify things I hadn't fully understood"*	0.63
Student peer community 5 items: 2 from HowULearn /ETLQ/ASSIST, 2 self-defined items *"I have learned to explore ideas confidently with other students"*	0.73
Non-academic and avoidance strategies	
Certain knowledge 4 items from MED NORD, IGSO *"Teachers should share among themselves the same views on issues that are to be learned"*	0.60
Task avoidance 4 items from MED NORD, ETLQ/ASSIST *"What often occurs is that I find something else to do when I have a difficult task in front of me"*	0.68

The Nexus questionnaire was pre-tested and shown to be a validated instrument in 2011–2013 with a three-step piloting round. The first paper pre-study version of the questionnaire consisted of a total of nine scales, and data were collected from students at different study stages (n = 111) in the context of the teaching situations. With this pre-test, the structure of the Nexus questionnaire began to take shape, and five of the scales were already identical to those in the final version. Next, a second pre-testing round was conducted with two pilot groups (n = 54) and with first-year students, in particular. The first actual round of data collection in all faculties in 2013 was at the same time as a third, final pre-testing round. Based on this 3-step piloting, the final 39-item and 8-scale version

of the measurement was formed and verified. The piloting phase scale reliabilities (Cronbach's alpha) of the final 8 scales varied between 0.62 and 0.83. The scale reliability coefficients of the Nexus measure, throughout the six years of data collection, yielded very similar levels (Table 2).

Data analysis

Data analysis followed an exploratory and nonexperimental study design (Tabachnick and Fidell 2007), where correlational interrelationships among variables were assessed, and multivariate statistical analyses were adopted for examining relationships among multiple variables. At first, the SPSS 25 statistical software and its missing values analysis tests were utilised to examine the possible patterns in the missing responses. All variables other than "age" had fewer than 5% of their values missing, of which none were systematically distributed, and, due to the large data set, these missing values presented no serious consequences in terms of the analysis and results (Tabachnick and Fidell 2007, 62–63). Different options for replacing the missing values were considered for the age variable (with a missing values' proportion of 22.9%), but predicting and replacing the missing responses seemed to produce possibilities of errors, so the analyses and the recoding of the age variable into age group categories were eventually performed without the missing values.

All eight scales in the Nexus measurement were verified with principal component analysis, and Cronbach's alpha coefficients were used to examine the internal consistency of the eight scales. Then, the descriptive statistics (M, SD) and zero-order correlations (Pearson's r) were observed for the whole sample and for all the scales in the measurement. These correlations provided information on which variables could be selected for further analyses together with the engagement scales or profiles.

In the next phase, the five individual-level engagement scales were reduced to two main patterns of personal engagement. This was done with exploratory factor analysis (maximum likelihood, varimax rotation). The possible associations between the selected background variables and the three other measurement scales and the two verified personal engagement factors were examined further with multiple regression analysis. With multiple linear regression analysis, the relationship of several selected variables can be modelled to the specific dependent variable (factor score variable). Decisions about which variables to include in the model are based on the stepwise regression of multiple variables, while simultaneously removing the non-important ones (Tabachnick and Fidell 2007, 139–141).

Cluster analysis was conducted as the main analysis method in this study to identify the engagement clusters based on the two personal engagement factor-score variables and the standardised z-score variables of the three other measurement scales. Cluster analysis is a multivariate method of providing a classification where the formed clusters are as far apart as possible, while ensuring that the members of a given cluster are as similar as possible to each other (Huberty, Jordan, and Brandt 2005; Ammon et al. 2008). This classification was implemented with K-means cluster analysis, which is particularly suited to larger data sizes and to situations in which the number of clusters to be formed is predictable to some extent (Ammon et al. 2008). Possible general predictors for the three identified engagement cluster memberships were further investigated with a multinomial logistic regression analysis. Cluster membership is a categorical variable as a dependent variable and multinomial logistic regression allows the possibility of evaluating the probability of memberships in the groups based on the values of the chosen significant predictor variables (Tabachnick and Fidell 2007, 24–25, 437).

Results

Means, standard deviations and zero-order correlations of the engagement scales and variables

Concerning the first research question, the study began with a descriptive analysis of means and correlations. Statistically significant zero-order correlations (r) between the engagement scales were observed in accordance with the theoretical expectations in the framework (Table 3). The three scales of "academic and emotional commitment" (1, 2, 3) correlated strongly with each other, as did the two scales of "social learning and participation" (5, 6). These components and scales also correlated strongly with the "self-confidence and transformation" scale (4), which was seen as being constructed as a result of successful engagement and building a positive sense of identity. As expected, the "non-academic and avoidance strategies" scales (7, 8) were negatively associated with all the other engagement scales. Therefore, these scales seem to sufficiently describe the possible factors that improve or hinder engagement among Finnish university students.

In the first year of studies, the importance of students' own peer communities seems to be slightly stronger in terms of academic and emotional commitment than that of the academic community. However, the "deep approach" scale (1), as a part of the "academic and emotional commitment" scale (1, 2, 3), correlates more strongly with the academic community (5) than with the student peer community (6). Therefore, the academic community nevertheless seems to be important for engagement, especially in terms of the deep approach to learning.

Table 3. Means, standard deviations, and zero-order correlations of the studied scales and variables.

Scales and variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Deep approach	1												
2. Organised studying	.388**	1											
3. Meaning of studies	.339**	.442**	1										
4. Self-confidence and transformation	.438**	.488**	.690**	1									
5. Academic community	.365**	.278**	.333**	.448**	1								
6. Student peer community	.178**	.306**	.372**	.441**	.404**	1							
7. Certain knowledge	-.349**	-.128**	-.306**	-.283**	-.235**	-.087**	1						
8. Task avoidance	-.405**	-.640**	-.411**	-.403**	-.280**	-.167**	.293**	1					
9. Age group	.273**	.273**	.183**	.168**	.123**	.005	-.152**	-.280**	1				
10. Academic credits completed	.114**	.273**	.145**	.146**	.114**	.051*	-.051*	-.203**	.389**	1			
11. Previous study credits elsewhere	.125**	.128**	.063	.064	.023	-.022	-.116**	-.144**	.383**	.046	1		
12. Hours per week studying	.073*	.134**	.064*	.084**	.076*	.109**	-.023	-.106**	-.065	.052	-.057	1	
13. Clarity of occupational conception	.195**	.350**	.451**	.426**	.204**	.284**	-.047*	-.224**	.190**	.115**	.180**	.068*	1
M	4.04	3.67	4.35	3.98	3.04	3.86	2.36	2.39	2.57	49.13	132.59	21.85	3.21
SD	.590	.735	.751	.782	.715	.698	.698	.762	1.631	37.358	123.495	14.257	.868
Scale	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–4	0–x (ratio)	0–x (ratio)	0–x (ratio)	1–4
Total number of items	5	6	4	6	5	5	4	4	NA	NA	NA	NA	NA

Note: NA = Not Applicable. *$p < .05$; **$p < .01$.

Several background variables also appeared to have statistically significant associations with engagement scales (Table 3). Noteworthy associations included relationships between age groups (9), academic credits earned (10) and the clarity of occupational conception (13) and the eight engagement scales (1–8). These potential associations with engagement are particularly noteworthy for further examination in this study.

Factor analysis and predictors for the identified personal engagement factors

Concerning the second research question on orientations that enhance or hinder engagement, the next phase in the analysis was to reduce the five individual-level engagement scales down to a smaller number of factors. With exploratory factor analysis and the maximum likelihood method, it was possible to identify an adequate two-factor solution (Table 4). The results of the Kaiser-Meyer-Olkin test (> .80) and Bartlett's test of sphericity ($\chi 2 = 2241.29$, $p < .001$) showed the data to be suitable for factor analysis. Tabachnick and Fidell (2007) recommend a loading of .320 as the cut-off point of the minimum loading-on factor, and this principle was followed here. In this case, item cross loadings for two factors are clear: for one factor, the loading is positive, and for the other, negative (see Table 4), so the situation is unambiguous in terms of interpretation. Variable specific communalities were sufficient for this factor solution (between 0.34 and 0.92).

Table 4. Two-factor solution of the measured five engagement scales in the "academic and emotional commitment" dimension.

Scales	Factor loadings		Communality
	F1	F2	
Organised studying	.956		.92
Meaning of studies	.435	-.336	.34
Deep approach	.375	-.459	.35
Task avoidance	-.645	.348	.54
Certain knowledge		.701	.50
Eigenvalues	2.51	0.94	
Explained variance (%)	50.17	18.80	

Factors were named such that F1 described an academic orientation to studies, whereas F2 described a non-academic orientation. Factors were interpreted by the loading items within them (Tabachnick and Fidell 2007). The academic orientation factor describes a positive engagement orientation in studying and learning, in which "organised studying" seems to be the strongest component. Similarly, the non-academic orientation factor mainly describes disruptive learning strategies in engagement, along with an unclear meaning concerning studies and a lower level of depth in terms of learning. These two factors explain 68.97% of the total variance in the combined six-year data (Table 4). Therefore, these factors sufficiently explain the phenomenon at the individual level and provide a basis for further analysis.

The possible direct associations with the two verified engagement factors were examined with multiple linear regression analysis. These factors were saved as factor score variables, which both served as dependent variables (DVs) in further analyses. Predictor variables were tested with the enter method in the regression model. Several independent variables were found to be statistically very significant ($p < .001$) predictors for personal academic orientation: academic community and student peer community at the collective level of studying, age group, academic credits earned, hours per week spent studying and the clarity of occupational conceptions connected to studies. The R^2 coefficient level of the model was .321.

The identification of potential predictors for a non-academic orientation was more difficult to verify. In the univariate linear regression analysis (with the enter method), only two statistically significant ($p < .001$) predictors were found, both with a negative association with a personal non-academic orientation (negative standardised beta coefficient): academic community and age group. Therefore, it can be concluded that the lower the importance of the academic community or the younger the student, the more probable a non-academic orientation in studies. This model's R^2 coefficient level was lower, with a level of .127.

Identifying engagement clusters and further comparing them in different disciplinary fields

For the third research question, whether respondents could be classified into specific engagement groups based on their personal academic or non-academic orientations, together with other engagement components, was examined in more detail with K-means cluster analysis. The K-means algorithm gives a simple typology of formed clusters, with no particular further organisation or structure within them (Huberty et al. 2005). Therefore, it is also interpretively straightforward. K-

means cluster analysis was carried out experimentally in this case with 2, 3 or 4 cluster solutions. Interpretatively, the clearest solution was reached with three clusters (Table 5).

Table 5. The three engagement clusters and raw-score means.

Standardized scales	Cluster 1 N = 834	Cluster 2 N = 289	Cluster 3 N = 803	F	Sig.
Academic orientation (Factor score)	-.25697	-.92804	.60089	485.837	.000
Non-academic orientation (Factor score)	-.01783	.70416	-.23491	182.146	.000
Self-confidence and transformation (Zscore)	-.09160	-1.61792	.67693	1359.100	.000
Academic community (Zscore)	-.35810	-.98778	.73087	706.014	.000
Student peer community (Zscore)	-.19945	-1.16295	.62650	596.680	.000

Cluster 1 was identified as a “loosely engaged” cluster because in this group of respondents, all engagement dimensions were estimated as more or less below average (Table 5). Second, cluster 2 was identified as a “non-academically engaged” cluster because, in this group, the emphasis on non-academic and avoidance study habits (a non-academic orientation) was the only one well above average. Third, cluster 3 represented a group of respondents who seemed to engage in studies as the theory suggests and was identified as the “academically engaged” cluster. Within this group, the individual- and community-level dimensions, as well as the self-confidence and transformation dimensions, are all well above average.

For the whole of the six-year data, the overall situation seems to be that slightly more than two fifths of the respondents (41.7%) are academically engaged, slightly more than two fifths of the respondents (43.3%) are loosely engaged and fewer than one fifth of the respondents (15.0%) are non-academically engaged (Table 5). This illustrates the overall situation of the first-year students’ engagement throughout the data. This result is similar to the national survey data of first-year

students in Finnish universities in 2013 in the Student Barometer Survey, which compared strongly, moderately and weakly engaged groups (Korhonen et al. 2017).

Once clusters are established, memberships can be used to further understand diverse student populations at one institutional level (see Ammon et al. 2008). Engagement clusters were utilised to identify disciplinary differences in engagement. Both are categorical variables; therefore, the three engagement clusters were cross tabulated with respondents' faculties (Table 6). Nine faculties existed at the university being researched at the time of data collection, but biotechnology is a very small discipline, so it was combined with medical sciences in the table

Table 6. Crosstabulation of engagement clusters in different disciplinary fields.

			Disciplinary field							
			Information and Computer Sciences	Management and Administrational Sciences	Education Sciences	Language, Translation, and Literary Studies	Biotechnology and Medical Sciences	Health Sciences	Communication Sciences and Theatre	Social Sciences
Cluster	**Loosely engaged**	Count	106	180	168	98	48	35	37	162
		Expected Count	96.1	163.7	172.8	94.0	58.9	46.3	32.9	169.3
		% within Disciplinary field	47.7%	47.6%	42.1%	45.2%	35.3%	32.7%	48.7%	41.4%
	Non-academically engaged	Count	63	54	42	56	8	6	15	45
		Expected Count	33.3	56.7	59.9	32.6	20.4	16.1	11.4	58,7
		% within Disciplinary field	28.4%	14.3%	10.5%	25.8%	5.9%	5.6%	19.7%	11,5%
	Academically engaged	Count	53	144	189	63	80	66	24	184
		Expected Count	92.6	157.6	166.4	90.5	56.7	44.6	31.7	163,0
		% within Disciplinary field	23.9%	38.1%	47.4%	29.0%	58.8%	61.7%	31.6%	47,1%
Total		Count	222	378	399	217	136	107	76	391
		Expected Count	222,0	378.0	399.0	217.0	136.0	107.0	76.0	391.0
		% within Disciplinary field	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

By far the most respondents belonging to the academically engaged group were students of biotechnology and medical sciences (58.8%) and health sciences (61.7%) (Table 6). It is noteworthy that these faculties also have very few non-academically engaged students (below 6%). Another extreme was the fields where the proportion of non-academic students was significantly higher, such as in language, translation and literary studies (non-academically engaged: 25.8%) and in information and computer sciences (non-academically engaged: 28.4%). In these fields, the proportion of non-academically engaged students was at the same level as the academically engaged ones. Similarly, the proportion of loosely engaged students in these two faculties was significantly higher (nearly 50% in each).

Further possible general predictors for the identified engagement cluster memberships were investigated with multinomial logistic regression analysis, with the fourth research question in mind. These predictors can also offer some help for the general interpretation of disciplinary differences. Cluster membership was chosen as the dependent variable, and several categorical background variables were tested as predictors. A multinomial logistic regression model was created so that academically engaged membership was chosen as a reference category. This model attempts to explain the relative effect of differing explanatory categorical variables on the outcomes (see Rodriguez et al. 2018). Statistically significant results were found with age and the clarity of occupational conception variables (Table 7).

Table 7. Multinomial logistic regression analysis results.

	Loosely engaged OR (Std. error)	**Non-academically engaged OR (Std. error)**
Age		
–20 years	1.379 (.199)	2.949 (.414) **
21–24 years	1.285 (.200)	2.941 (.415) **
25–29 years	1.303 (.229)	2.989 (.449) *
30–34 years	1.086 (.262)	1.501 (.526)
35–39 years	.726 (.287)	1.534 (.555)
40– years	REF.	REF.
Clarity of occupational conception		
1= None or still unclear	4.040 (.376) ***	37.430 (.386) ***
2= A very weak idea or conception	3.090 (.240) ***	15.498 (.279) ***
3= Some idea or conception	1.918 (.122) ***	2.295 (.215) ***
4= A very clear conception	REF.	REF.
R^2 (Nagelkerke)	0.187	
Classification percentage	52.6%	
N	1488 (Missing 449)	

Belonging to younger age groups and unclear occupational conceptions are statistically significant predictors for loosely or non-academically engaged cluster memberships (Table 7). This result indicates that the negative learning patterns and habits of non-academic engagement are more prevalent among younger age groups. In addition, the resulting strong connection between an unclear occupational conception and loosely engaged and non-academically engaged groups is noteworthy.

Discussion

The results of the Nexus self-assessment survey reinforce the assumption that academic and emotional commitment, with its relevant dimensions (organised studying, meaning of studies, deep approach), builds a stronger personal academic orientation towards studies and, therefore, contributes positively to the self-confidence and transformation of students. With regard to social learning and participation opportunities, the results indicate the positive impact of both the student's peer communities and academic communities on personal engagement. On the other hand, the results also generally highlighted that the student's peer communities play a slightly more prominent role in early studies than the academic community does. An academic teaching-learning community offers orientation and tutoring for first-year students related to starting their studies and their study practices, but at the same time, student organisations in Finland are very active in terms of planning informal social activities for first-year students, and this can have an even stronger impact on their engagement.

The main finding of the study was the identification of the three different engagement clusters, each representing a very different relationship of students with engagement and learning. Academically engaged students show a very balanced relationship with an academic orientation in their studies and participation in study-related communities, whereas non-academically engaged students have tendencies towards certain knowledge-seeking and task-avoidance behaviours. Likewise, the strengthening of self-concept and transformation clearly seems to be stronger within the academically engaged cluster than in other clusters. The positive associations of several dimensions of engagement with self-efficacy or self-esteem, together with transformative learning, have also been observed in previous studies (Bowden et al. 2019). In contrast, loosely engaged students seemed to have a shallower academic orientation and a weaker relationship to study-related communities. Their self-concept and transformation also seemed to be at a lower level than those for students in the academically engaged cluster, but higher than for those students within the non-academically engaged cluster.

The three engagement clusters were also distributed in very different ways within different disciplinary fields. Differences between faculties were greater than expected; however, based on the findings of many other large-scale student engagement studies in different countries, disciplinary variation is no surprise (Leach 2016; Kandiko Howson and Buckley 2017). Fields of study within which the proportions of non-academically engaged and loosely engaged students were higher are

mostly the same — humanities together with information and computer sciences — which has also emerged in some previous studies of Finnish students. These students belong to fields in which the risk of the non-completion of studies is higher (Korhonen and Rautopuro 2019), and the non-commitment to studies is also higher than in other fields (Mäkinen et al. 2004; Korhonen et al. 2017).

It should be noted that the results are indicative in the studied university because of the potential selection bias error of non-probability sampling. Response activity varied among subgroups, and students from three faculties were more active than others. Self-reported measurements are the most common method for assessing student engagement in education (Fredricks and McColskey 2012), and the provided dimensions are always only able to reflect the selected aspects of engagement. However, the collection of samples over several years improved the validity and reliability of the results, since similar findings are repeated when looking at individual year sub-samples separately.

Generally, the findings pose the question of how the academic teaching and learning communities of an institution can benefit from the engagement assessment results to develop institutional and pedagogical guidance practices and to offer focused support for students in different disciplinary fields. On the basis of the results, age is one of the influencing factors in disciplinary-based differences in student engagement, as the age structure of the first-year student population varies across disciplines and faculties. Considering the results, the youngest first-year student groups are likely to need more support and guidance in acquiring academic skills than other more mature groups. The support targeted at them could focus on the literacy practices of an academic community (e.g. Hallett 2013) and could be a means of mitigating the development of elusive strategies and task avoidance tendencies.

In addition to focused support for academic skills, participation in study-related communities appears to generally be a factor in terms of promoting engagement, especially in those fields in which the distributions of non-academically engaged and loosely engaged students are higher. Including small group activities in first-year courses and offering other informal meetings and social activities with peer students and staff members could be supportive of engagement. Learning communities' positive influence on strengthening engagement and a sense of belongingness has been demonstrated in many earlier studies (Tinto 1997, 2006; Zhao and Kuh 2004; Thomas 2012; Masika and Jones 2016).

The observed association with students' clarity in terms of occupational conception reflects the different nature of teaching and learning in different disciplines in connection with academic

knowledge and working life. This can be further linked to disciplinary knowledge and epistemology (Kember et al. 2014) and epistemic match between student and discipline (O'Siochru and Norton 2014). It would seem relevant to make the identification of the conditions for own learning and expertise within certain academic knowledge contexts more visible in the starting phase of studies. Previous research has highlighted the meaning of formative assessment forms, like portfolios, to link knowledge and learning more clearly (see Dysthe and Engelsen 2004; Klenowski et al. 2006). Getting students working with portfolios may help clarify their beliefs regarding knowledge and the use of deep learning strategies in terms of connecting theory to practice, which can be difficult for new students in study fields that are general in nature and that do not prepare students for a certain profession.

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