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Experiences of the Teaching-Learning Environment and Approaches to Learning: Testing the Structure of the "Experiences of Teaching and Learning" Inventory in Relation to Earlier Analyses

Evangelia Karagiannopoulou and Fotios Milienos
University of Ioannina

This study examines the structure of the inventory, the second part of the Experiences of Teaching and Learning Questionnaire (ETLQ). Three hundred and sixty-four students participated in the study. To strengthen the validation of the ETL, the short version of Approaches to Learning included in the ETLQ was substituted by its widely-used, full-version Approaches and Study Skills Inventory for Students (ASSIST). Exploratory and confirmatory factor analyses tested the factor structure of the inventory. Twenty questions covered four factors: "Congruence and coherence in course organization," "Teaching for understanding and encouraging learning," "Support from other students," and "Integrative learning and critical thinking". Appropriate associations between these factors and (a) the subscales comprising the deep, surface, and strategic scales (b) acquired knowledge, generic skills, and (c) self-evaluation supported the validation of the instruments. The factors seem highly similar to those reported in previous studies and Cronbach coefficients were appropriate. The study suggests the ETL as a valuable instrument to be used across cultures and different contexts.

Introduction

During the last three decades the educational literature has focused on the effect of the academic environment on how students learn and, recently, on the importance of powerful teaching-learning environments that can be expected to cultivate and reward students' understanding (McCune & Entwistle, 2011). These studies belong in the tradition of the development of student-centered environments that enhance students' learning (Biggs & Tang, 2011). Most of the studies carried out in the research tradition of student learning have used self-report instruments which emerged from research that has been carried out by research centers in higher education in various countries (e.g. in the UK, Belgium and Finland). These research groups were aiming at finding ways of improving the quality of learning in higher education and also of making links with academic achievement. Students' approaches to learning appear at the heart of all these studies and are being seen as an important construct in considering effective teaching and course design (Diseth, 2007; Gijbels, Segers, & Struyf, 2008). Approaches consist of a complex entity involving both the ways of studying generally adopted by students and their experiences of the academic environment. Among the most widely used research instruments to evaluate the learning context and approaches to learning are those developed by the Edinburgh group (e.g., Entwistle, 2009; Entwistle & Ramsden, 1983; the ETL project, see http://www.etl.tla.ed.ac.uk). The present study provides indications of the use of the "Experiences of Teaching and Learning" (the second part of the Experience of Teaching and Learning Questionnaire, ETLQ) as a valid instrument that explores students' experiences of the environment, associations among the dimensions of the learning environment, and approaches to learning, acquired knowledge, generic skills, and self-evaluation, and thus supports the validity of the "Experiences of Teaching and Learning Inventory" (ETL) inventory.

Perceptions of the Learning Environment and Approaches

The educational literature discusses three major approaches: deep, surface, and strategic (Entwistle, McCune, & Walker, 2001). These concern either the development of personal meaning (deep approach), the routine memorization and unreflective study strategies to cope with exam demands (surface approach), or the use of strategies to achieve high grades (strategic approach). The central idea was the distinction between deep and surface approaches to learning (Marton & Säljö, 1976), which differentiated the student's intentions (to understand for oneself or to reproduce material for the teacher or examiner) and the learning processes used to fulfill those intentions (Marton, 1975; Marton, Hounsell, & Entwistle, 1984). Intention (a concept equivalent to motivation) is expressed in one of the subscales for each approach; the remaining subscales depict the relevant processes. In particular, seeking meaning, achieving, and fearing failure correspond to deep, strategic, and surface approaches respectively.

A range of studies has shown that students' experiences of the academic context have a crucial influence on approaches to learning. A positive perception seems to be positively related to a deep approach and negatively related to a surface approach to learning (Baeten, Kyndt, Struyven, & Dochy, 2010;

Karagiannopoulou & Milienos, 2013; Karagiannopoulou & Christodoulides, 2005; Kreber, 2003; Lawless & Richardson, 2002; Parpala, Lindblom-Ylänne, Komulainen, Litmanen, & Hirsto, 2010; Richardson, 2005; Richardson & Price, 2003; Sadlo & Richardson, 2003). For example, inappropriate assessment has been positively correlated with the surface approach (Lizzio, Wilson, & Simons, 2002; Marton & Säljö, 1997; Trigwell & Prosser, 1991a). Also, Sadlo and Richardson (2003) found that clear goals and standards and appropriate assessment are negatively correlated with any of the aspects comprising the surface approach. Lizzio et al. (2002) and Karagiannopoulou and Christodoulides (2005) found that students' perceptions of good teaching influence the deep approach to learning. However, research has failed to indicate a consistent relationship between a deep approach and positive perceptions of the academic context (e.g., good teaching; see Asikainen & Gijbels, 2017; Entwistle, 2009). Recent studies have indicated that the perceived quality of teaching tends to be positively correlated with deep and strategic approaches and negatively correlated with a surface approach (Diseth, 2007; Diseth, Pallesen, Brunborg, & Larsen, 2010). Diseth, Pallesen, Hovland, and Larsen (2006) presented a model in which "good teaching" predicted deep, surface (negative relation) and strategic approaches to learning, whereas "clear goals and standards" predicted a strategic approach while "appropriate workload" predicted both deep and surface approaches. All these elements should be accounted from the constructive alignment perspective (Biggs, 1996; Biggs & Tang, 2011), ensuring that teaching, assessment, and every aspect of the teaching-learning environment are aligned to constructivist principles of learning (Xu, 2004). From this perspective, the development of a questionnaire that explores the aspects of the environment that seems most likely to affect students' engagement with studying and learning (Entwistle, McCune, & Hounsell, 2003) appears of crucial importance for our understanding of effective teaching.

Besides, some qualitative studies have suggested the idea of a "meeting of minds" as a cognitive-emotional experience (Karagiannopoulou & Entwistle, 2013). Experiences of tutors who are passionate for their subject, authentic, supportive, and encouraging of students' learning seem to come along with personal understanding (Entwistle, Karagiannopoulou, Ólafsdóttir, & Walker, 2016); and experiences of negative nature seem to regress students in their learning (Karagiannopoulou, 2010; Karagiannopoulou & Entwistle, 2015).

Experiences of the Teaching-Learning Environment and Achievement

Few studies have found a positive correlation between an overall measure of experiences of the learning environment and assigned marks for coursework (Richardson & Price, 2003) or between GPA and good teaching (Lizzio et al., 2002; Karagiannopoulou & Christodoulides, 2005; Karagiannopoulou & Milienos, 2015). Most recent studies indicate (Diseth, 2007; Karagiannopoulou & Milienos, 2015) a significant correlation between examination grades and teaching quality and appropriate workload, but this relation was not confirmed by techniques of structural equation modeling, nor did it include measures of approaches to learning.

The Experiences of Teaching and Learning Questionnaire

The ETL, the validity of which is tested in the present study, is the second part of the ETLQ that has drawn on Student Learning Research. It was developed as a part of the research project, "Enhancing teaching-learning environments in undergraduate courses" (the ETL project; see http://www.etl.tla.ed.ac.uk), which investigated ways in which findings from research could be used to create a learner-centred learning environment for students (Entwistle et al., 2003). To develop the questionnaire an extensive review of the literature and also an analysis of earlier inventories measuring students' perceptions of teaching and of learning environments were carried out by a range of researchers (Entwistle, 2003; Entwistle, McCune, & Hounsell, 2002; Steis, Maeyer, Gijbels, & Van Petegem, 2012).

The ETLQ has five sections. In particular, the first section is the Approaches to Learning and Studying Inventory (not used in the present study). The second part, ETL, covers the students' perceptions of the teaching and learning they had experienced on the course unit. The third section (not used in the present study), Demands Made by the Course Unit, asks about the demands that students felt the course unit made in terms of knowledge requirements and learning processes. The fourth section, What You Learned from This Course Unit, paralleled those aspects in relation to what they felt they had actually gained from the unit, i.e., concerning knowledge and generic skills, and this section has been used in the present study as an outcome variable. The last section was a single item asking students how well they had felt they had done in the courses they had taken (self-evaluation); this has been used in the particular study as an outcome.

The second part of the ETLQ, Experiences of Teaching and Learning (ETL), which is at the heart of this study (testing each validation) consists of four subscales namely: Organization and Structure, Teaching and Learning, Students and Teachers, and Assessment and Other Set Work. Entwistle et al. (2003) and Xu (2004) reported that the most consistent set of substantial correlations relate all but one (peer support) of the perceptions subscales to students' ratings on the

knowledge the students believed they had achieved, and most of these subscales also relate to students' ratings of gains in their processes of learning. Concerning self-rating of attainment, Xu (2004) found that most of the subscales (except "student support" and "assessment for understanding") included in students' perceptions of the teaching-learning environment were correlated with a self-rating of attainment. Concerning associations between perceptions and approaches, all studies indicate that positive experiences link to deep and strategic approaches (Entwistle et al., 2003; Parpala, Lindblom-Ylänne, Komulainen, & Entwistle, 2013; Xu, 2004). However, the results are not consistent. Xu (2004) found strong patterns only for the deep approach, with "Assessing for Understanding" and "Teaching for Engagement in Studying" being the strongest. Entwistle et al. (2003) found that the strongest patterns showed associations of deep and surface approach with the perceptions; the highest values show a deep approach associated with "Encouraging Learning and Assessing Understanding" while a surface approach was associated with "(Lack of) Interest Evoked." Concerning the strategic subscales, "Monitoring studying" was most closely associated with "Encouraging learning," "Assessment feedback," "Assessing understanding," and "Staff support"; a similar, but less strong, pattern was found for organized studying and effort management (strategic subscales). In the same line, Parpala et al. (2013) reported strong positive correlations among a "Deep approach," "Organized studying," "Intention to understand," and all of the six factors reflecting students' perceptions of the teaching-learning environment ("Teaching for understanding," "Alignment," "Staff enthusiasm and support," "Interest and relevance," "Constructive feedback," and "Support from other students"). They also reported negative correlations of the six factors with a surface approach with the strongest patterns to show links between surface approach and "Teaching for understanding" and "Alignment." The strongest positive and negative correlation of experiences with deep and surface approaches concerned "Interest and relevance." Overall, the research findings are in the same line while slight variations are due to heterogeneity of the sample or to different cultures. In line with Parpala et al.'s (2013) findings, Herrmann, Bager-Elsborg, and Parpala (2016), using the LEARN questionnaire (based on the ETL), found relations between all of the factors of the learning environment with the three approaches with the strongest patterns to concern the deep and strategic approach (organized effort).

There are only a few studies (Entwistle et al., 2003; McCune, 2003; Parpala et al., 2013; Xu, 2004) that have explored the factor structure of the ETL questionnaire (included in the ETLQ), all of which report various challenges (e.g., Parpala et al., 2013; Steis et al., 2012). Although most of the studies seem to indicate a conflicting factor structure, a close look at them indicate high similarity. In particular, Entwistle et al. (2003) suggest a five-factor structure in a UK sample: "Organization and structure," "Encouraging learning," "Assessment and assignments," "Supportive climate," and "Evoking interest." Xu (2004) in a Chinese sample of undergraduate students also reports five factors: "Engagement," "Supportiveness," "Understanding," "Challenge and support," "Clarity and choice," and "Assessment focus." More recent studies suggest a six factor solution. Entwistle (2009) identifies the following factors: "Congruence and coherence in the course unit as a whole," "Teaching for understanding," "Staff enthusiasm and support," "Constructive feedback," "Support from other students," and "Interest and enjoyment generated by the course." A recent study (Parpala et al., 2013), where both UK and Finnish data were analyzed, suggests a short version (that includes 21 items from the ETL) with a six factor solution, namely, "Teaching for understanding," "Alignment," "Staff enthusiasm and support," "Interest and relevance," "Constructive feedback," and "Support from other students." Most recently, Herrmann et al. (2016) confirmed the factor structure of this Finnish version of the ETL, with a Danish sample. Also, Rytkonen, Parpala, Lindblom-Ylänne, Virtanen, and Postareff (2012) used the Finnish version of 21 items and suggested four factors: "Relevance and evoking interest, Constructive feedback, Peer support and Alignment." This version ended up to a further reduced and modified version by Asikainen, Parpala, Lindblom-Ylänne, Vanthournout, and Goertjens (2014); they suggested a factor, "Teaching for understanding," to be comprised by items identical to those in the "Relevance and invoking interest" mentioned by Rytkonen et al. (2012). Besides, Steis et al. (2012) confirmed the factor structure of a shortened (25-items) version of the ETL. However, they had failed to confirm the full version (40 items). They suggested a six-factor structure, namely, "Aims and congruence; Teaching for understanding; Assessing understanding; Staff enthusiasm and support; Student support; and Interest and enjoyment."

In spite the diversity in factor structure of the ETL, Parpala et al. (2013) have reported it as a robust and reliable instrument for use across countries at either the degree level or the single course module level; they note though that the psychometric properties remain to be further explored.

The present study aims to test the factor structure of a translated version of part 2 (ETL) of the Experiences of Teaching and Learning Questionnaire (ETLQ), consisting of 40 items (Entwistle, 2005). Furthermore, the validation of the ETL was tested by the use of Approaches and Study Skills Inventory for Students (ASSIST, http://www.etl.tla.ed.ac.uk) instead of its short version included in the ETLQ, used in previous studies

(e.g. Parpala et al., 2013). The use of the full version of the instrument that measures approaches to learning (ASSIST), instead of the short one included in the ETLQ, draws on the "open" discussion about the accurate measuring of students' approaches by short versions in different contexts and disciplines. Also, this decision draws on the difficulty of the questionnaires to grasp the nuanced picture of students' learning, particularly where they focus on specific aspects of any approach, which is often the case with the short versions of the questionnaires. The ASSIST has been a widely-used instrument with good psychometric qualities explored by a range of studies (see Diseth, 2001; Karagiannopoulou & Milienos, 2013); most of the studies report psychometric assets and raise very few limitations. On the other hand, the short version of it (the ALSI included in the ETLQ) has been used in a small number of studies, and recent updated short versions of the ASSIST (see Entwistle, 2009) seem to raise an issue of the appropriateness of the ALSI as a "strong" short version (of the ASSIST). Moreover, the ASSIST has been checked for its psychometric characteristics, in this particular sample, in a previous study (Karagiannopoulou & Milienos, 2013).

In particular, the present study tests the factorial structure of the ETL and explores its associations with (a) approaches to learning at a subscale level explored by ASSIST (b) knowledge and generic skills acquired, and (c) self-evaluation; the (b) and (c) are included in the ETLQ. In line with the use of the ASSIST, associations with outcomes were used to support validation since, apart from the very first ones listed above, there is a lack of studies indicating links between ETL and outcomes. Associations between the above variables (if similar to original research) would lend strength to the appropriateness of the use of the instrument in a different culture, especially in a context where evaluations are not necessarily welcome and research in students' learning is scarce. We assume that the expected associations among ETL, approaches to learning, knowledge acquired, skills acquired and self-evaluation, will support the use of this instrument across cultures as a robust one. The good psychometric properties of the ETL on a sample of students who are not familiar with reflections on their learning and academic environment, in terms of evaluation in Higher Education, will further support the validity of the instrument.

Method

Participants

The sample consists of 364 undergraduate students (97 first-year, 91 second-year, 75 third-year, and 101 fourth-year students) studying in a Department of Philosophy, Education, and Psychology. The average age was 20.42 years (sd=1.88) and the majority were female (88.1%). The number of students participating in the current study is similar, although a bit smaller, to that reported by Entwistle et al. (2003) and Xu (2004).

Instruments

ETLQ. The study focuses on the validation of part 2 of the ETLQ (for the relevant project, see http://www.etl.tla.ed.ac.uk) that explores ETL. Other sections of the ETLQ used in the present study are the following: the knowledge and generic skills acquired and self-evaluation. The ETL consists of 40 items that correspond to four subscales: Organization and Structure (e.g., The topics seemed to follow each other in a way that made sense to me), Teaching and Learning (e.g., We were encouraged to look for links between the courses), Students and Teachers (e.g., I enjoyed being involved in this course unit), and Assessment and other set work (e.g., I could see how the set work fitted in with what we were supposed to learn). In the present study only 31 out of the 40 items were used as relevant to the syllabus of the particular department (see Table 1). The exclusion of so many items met the need to get valid answers by the students since the experience of evaluation questionnaires used by the particular institution revealed many of the students to quit or just skim through the questionnaires in case they came across a number of questions irrelevant to the particular course they attended. As a result, we decided to keep a "tight" version of the ETL that directly fit to their experiences.

Items 3, 5, 10, 14, 20, 32, 35, 37, 40 (32-40 in our version; see the last part of Table 1) from the original questionnaire were not included in the version we used because they were viewed as irrelevant to the department. In particular, they concerned (a) student's choice over the material they had to study (32, 33 in our version; see also Herrmann et al., 2016) (b) different types of teaching in the context of a particular course and the use of web pages (35, 36 in our version) (c) aspects of encouragement that effectively improve students' learning and performance in the particular course (34, 37 in our version) and (d) forms of assessment and constructive feedback on any set work that had to be submitted (38, 39, 40 in our version). All of these items depict inherent differences underlying the Greek and the UK higher education. For example, Greek social science students almost never get (a) different types of teaching (lectures is almost always the case), (b) compulsory set-work, and (c) systematic feedback. Moreover, students do not refer to an academic advisor and are not expected to have consistent contact with a tutor (there is not course tutor in undergraduate studies).

Table 1
Experiences of Teaching and Learning Questionnaire

Items from the original scale included in the present study	
	Congruence and coherence in course organization (mean=15.40, sd=3.96, a= .69)
1	It was clear to me what I was supposed to learn in courses. (MSA[a]=0.775)
2	The topics seemed to follow each other in a way that made sense to me. (MSA=0.848)
3	The course unit was well organized and ran smoothly. (MSA=0. 882)
4	What we were taught seemed to match what we were supposed to learn. (MSA=0.861)
5	It was clear to me what was expected in the exams. (MSA=0.794)
	Teaching for understanding and encouraging learning (mean=43.9, sd=9.2, a=.85)
6	We were encouraged to look for links between the courses. (MSA=0.916)
7	I can imagine myself working in the subject area covered by the courses I have been taught. (MSA=0.836)
8	On most of the courses, I was prompted to think about how well I was learning and how I might improve. (MSA=0.88)
9	I could see the relevance of most of what we were taught in the courses. (MSA=0.922)
10	We weren't just given information; staff explained how knowledge is developed in this subject. (MSA=0.912)
11	The teaching encouraged me to rethink my understanding of some aspects of the subject. (MSA=0.92)
12	Plenty of examples and illustrations were given to help us to grasp things better. (MSA=0.889)
13	Courses have given me a sense of what goes on "behind the scenes" in this subject area. (MSA=0.913)
14	Teaching helped me to think about the evidence underpinning different views. (MSA=0.947)
15	Teaching encouraged me to relate what I learned to issues in the wider world. (MSA=0.948)
16	Staff were patient in explaining things which seemed difficult to grasp. (MSA=0.891)
17	Students' views were valued in courses. (MSA=0.923)
18	Staff helped us to see how you are supposed to think and reach conclusions in this subject. (MSA=0.937)
	Support from other students (Items included in the questionnaire used in the present study concerned Experiences and Support from either students or teachers) (mean=23.0, sd=5.29, a=.73)
19	Students supported each other and tried to give help when it was needed. (MSA=0.799)
20	I found most of what I learned in courses really interesting. (MSA=0.93)
21	Staff tried to share their enthusiasm about the subject with us. (MSA=0. 929)
22	Talking with other students helped me to develop my understanding. (MSA=0.843)
23	I enjoyed being involved in this course unit. (MSA=0.941)
24	I found I could generally work comfortably with other students. (MSA=0.763)
25	Courses provided plenty of opportunities for me to discuss important ideas. (MSA=0.905)
	Integrative learning and critical thinking (mean=22.96, sd=4.19, a=.70)
26	The handouts and other materials we were given helped me to understand the courses. (MSA=0.9)
27	I could see how the set work fitted in with what we were supposed to learn. (MSA=0.823)
28	You had really to understand the subject to get good marks in most of the courses. (MSA=0.827)
29	Doing the set work helped me to think about how evidence is used in this subject. (MSA=0832)
30	To do well in courses, you had to think critically about the topics. (MSA=0.854)
31	The set work helped me to make connections to my existing knowledge or experience. (MSA=0.866)
Items from the original scale excluded in the present study	
32	We were given a lot of choice over what we went about learning
33	We were allowed some choice over what aspects of the subject to concentrate on
34	On this unit, I was prompted to think about how well I was learning and how I might improve
35	The different types of teaching (lectures, tutorials, labs etc) supported each other well
36	The web pages provided by staff helped me to understand the topics better
37	I was encouraged to think about how best to tackle the set work
38	The feedback given on my work helped me to improve my ways of learning and studying
39	Staff gave me the support I needed to help me to complete the set work for this course unit
40	The feedback given on my set-work helped to clarify things I hadn't fully understood.

[a] Measure of Sampling Adequacy

The fourth section focuses on "What was learned from the course" (eight questions). In the present study, only the questions focused on (a) Knowledge and subject-specific skills (three questions, e.g. knowledge and understanding about the topics covered) and (b) Generic skills (three questions, e.g. ability to work with other students) were included. The two questions focused on information skills were excluded as inappropriate. Again, answer scores were added for the two subscales.

At the end of the questionnaire, students were asked to rate themselves objectively based on the marks, grades, and comments they had been given in the course of their studies (self-evaluation). Answers were ranged from 1 (badly) to 9 (very well).

ASSIST

ASSIST consists of three sections, and the second addresses "Approaches to Studying." The "Approaches to Studying" included in the ASSIST is a more recent version of the Approaches to Studying Inventory (ASI) originally developed by Entwistle and Ramsden (1983), which has been used in a large number of studies. The 52-item instrument, used in the pre-set study, includes three main scales measuring a deep approach, a surface approach, and a strategic approach to learning. The deep approach consists of four subscales: seeking meaning (e.g., Before tackling a problem or assignment, I first try to work out what lies behind it), relating ideas (e.g., I try to relate ideas I come across to those in other topics or other courses whenever possible), use of evidence (e.g., I look at the evidence carefully and try to reach my own conclusion about what I'm studying), and interest in ideas (e.g., Regularly I find myself thinking about ideas from lectures when I'm doing other things). The surface approach consists of four subscales: lack of purpose (e.g., Often I find myself wondering whether the work I am doing here is really worthwhile), unrelated memorizing (e.g., I find I have to concentrate on just memorizing a good deal of what I have to learn), syllabus-boundness (e.g., I tend to read very little beyond what is actually required to pass) and, fear of failure (e.g., Often I feel I'm drowning in the sheer amount of material we're having to cope with). The strategic approach consists of five subscales: organized study (e.g., I manage to find conditions for studying which allow me to get on with my work), time management (e.g., I organize my study time carefully to make the best use of it), alertness to assessment demands (e.g., When working on an assignment, I'm keeping in mind how best to impress the marker), achieving (e.g., It's important to me to feel that I'm doing as well as I really can on the courses here) and, monitoring effectiveness (e.g., I go over the work I've done carefully to check the reasoning and that it makes sense). Although most studies have good psychometric properties, for all of the three scales and the subscales consisting each of them there are limitations in the use of two of the strategic subscales. "Alertness to assessment demands" and "Monitoring effectiveness" subscales, included in the strategic approach, seem to load inappropriately (e.g. Byrne, Flood, & Willis, 2004; Diseth, 2001; Valadas, Goncalves, & Faisca, 2010), suggesting the exploration of the validation of the questionnaire for each particular sample. Such a limitation has been associated with different experiences of students through the years of study. Besides, the Cronbach's reliability coefficients of some of the subscales were relatively low, but were expected in case of psychological constructs (Byrne et al., 2004; Diseth, 2001; Karagiannopoulou & Christodoulides, 2005; Kreber, 2003; Valadas et al., 2010).

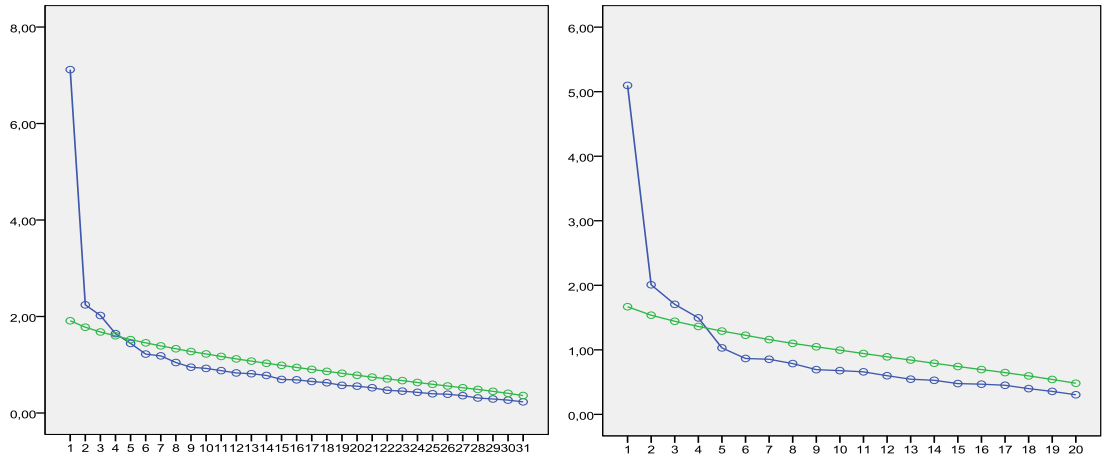
Procedure

A standard translation back procedure ensured that the meaning of each statement was expressed in the Greek version of the scales. Two social science academics who had graduated from UK Universities translated the questionnaire into Greek. A Greek lecturer who had been working in a UK University for a long time back-translated the questionnaire. The academics involved in the translation clarified differences in wording. In the Greek version of the questionnaire, the "Experiences of Teaching and Learning" (2nd section of the ETLQ) and the "What You Learned from This Course Unit" (4th section of the ETLQ) maintained the original structure. The students answered the questions with reference to the overall courses they had attended during their study in the particular department. The original scale referred to a particular course module. However, Parpala et al. (2013) clearly suggest the appropriateness of the use of the questionnaire at the degree subject level. In the present study, the questionnaires were printed and distributed during psychology lectures in the second academic semester. Students were asked to respond to the items using the same scale as in the original ETLQ.

Statistical Analysis

Exploratory (EFA) and confirmatory factor analysis (CFA) explored the properties of ETLQ. We randomly divided the sample into two equal parts; we contacted an EFA on the first half of our sample and confirmed (using CFA) the derived factor solution on the other half (for the appropriateness of this approach, see, e.g. Gerbing & Hamilton, 1996; Byrne, 2010; Kline, 2011; Raykov & Marcoulides, 2006;

Figure 1
The Scree plots with the random eigenvalues (Parallel Analysis)



Worthington & Whittaker, 2006; the study uses SPSS and Amos for the data analysis).

Results

First, we explored the Cronbach's Alpha reliability coefficients for the four subscales "Congruence and coherence in course organization" (α=0.69), "Teaching for understanding and encouraging learning" (α=0.85), "Support from other students" (α=0.73), and "Integrative learning and critical thinking" (α=0.70). The reliability coefficients for two of the subscales were considered acceptable (0.85 and 0.73; e.g. Nunnally & Bernstein, 1994), while the remaining were of moderate level (note also that these two subscales consist of fewer variables; see Table 1).

EFA and CFA

An orthogonal model using the Principal Axis Factoring (PAF; e.g. Kahn, 2006) extraction method on the correlation matrix explored the factor structure of the ETLQ. The PAF extraction method, along with a Promax (oblique) rotation, contributed to the analysis; no "extreme" outliers were detected. The Principal Component (PC) is also an appropriate extraction method, and most of the time these two methods, i.e., PC and PAF, offer equivalent results, particularly if there are high correlations among the items, the number of items is large, or the number of common factors is small (e.g., Johnson & Wichern, 2002; Rencher, 1995). KMO equals 0.83 and therefore meets most of the proposed acceptable values (e.g., Kaiser, 1974). The Measures of Sampling Adequacy of our items range from 0.763 to 0.948 (Table 1) and therefore are sufficient for our purposes.

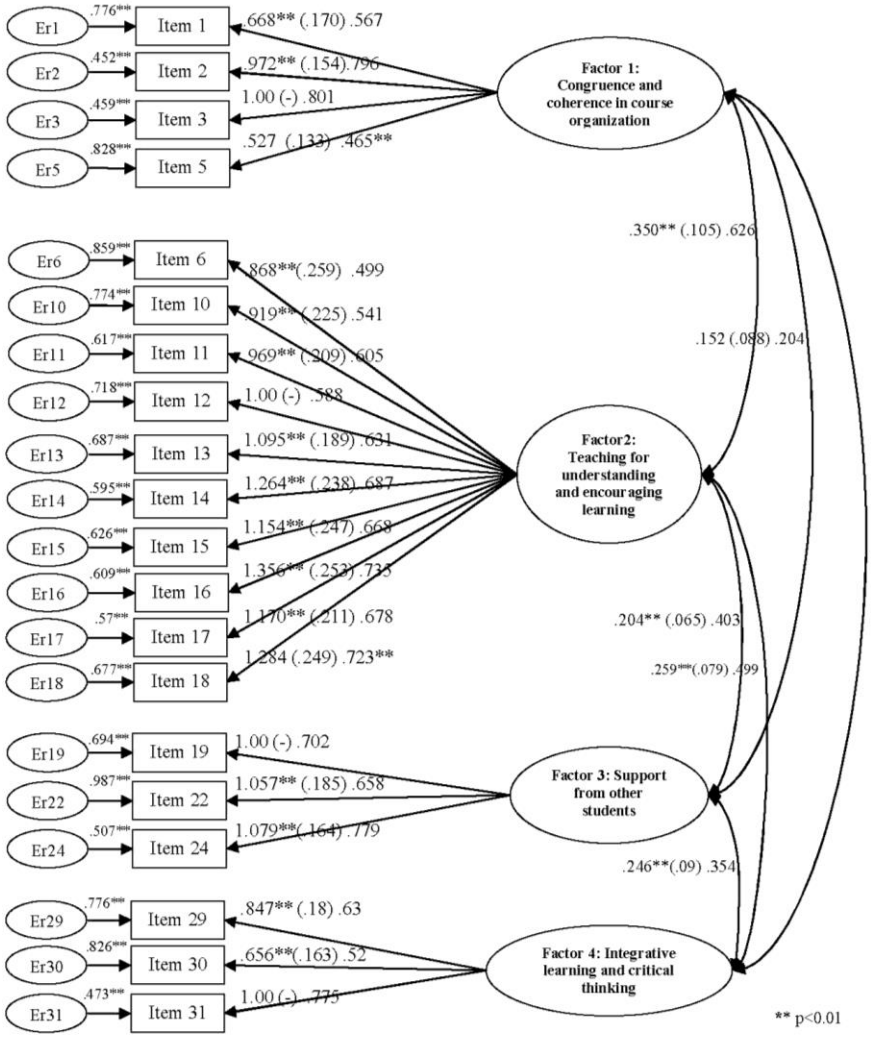
The 8 factors (deduced by the Kaiser rule) explain the 57.8% of data variability. Note that Kaiser rule often overestimates the number of factors (especially when the number of items is large, (e.g., Kahn, 2006), and hence it is necessary to consider other decision rules, as, for example, the scree test and parallel analysis. The scree plot (Figure 1a) does not support the existence of 8 factors; parallel analysis (e.g. Horn, 1965) suggests retaining 4 factors since the fifth eigenvalue is the first (real) smaller eigenvalue than the corresponding random (simulated) eigenvalue. Furthermore, according to the pattern matrix of the eight-factor model, it can be seen that at most two items load on the last four factors; this fact also supports the existence of four underlying factors.

Hence, the next step is to study a model with 4 factors, which explains the 34.7% of the total variance. The pattern and structure matrix of this model (not included here due to space limitations) reveal that items 4, 7-9, 20, 21, and 23 do not load on any factor (loadings<0.35 or have low cross-loadings); therefore, these seven items should be excluded from our 4 factor model. Note also that the items 25-28 have very low loadings (less than 0.40) and these loading become smaller (i.e. less than 0.35) after the exclusion of the above seven items; thus, these 4 items are also excluded from our analysis.

The new model (without the above 11 items) explains now the 40.2% (Table 2) of the variance, while the four factor solution is supported again by the parallel analysis and to some extent, by the scree plot (Figure 1b). The new Cronbach's Alphas for the four subscales became 0.66, 0.83, 0.71 and 0.62, respectively. Based on the rotated solution (Table 2) it can be seen that the expected factor structure for the

Figure 2

The verified model by CFA, on the second half of our sample; the un-standardized estimates, standard error of the estimates (in parentheses) and standardized estimates for each path and the variance of the error variables, are included



four subscales is verified by our data (the new KMO equals again 0.83). Before proceeding to CFA, it should also be mentioned that the correlations among the four factors (see the last part of Table 2) are all in moderate and positive levels (between factor 1 and factor 3 is found the greatest correlation).

Hence, the above procedure leads us to include 4 items in the first subscale (1-3 and 5), 10 items in the second subscale (6 and 10-18), 3 items in the third subscale (19, 22 and 24) and 3 items in the fourth subscale (29-31). Figure 2 illustrates the model we are going to verify (using CFA); potentially correlated factors are used.

The accuracy of our model is assessed by the following tests and descriptive fit indices (e.g. Raykov & Marcoulides, 2006): Chi-square=176.26 (p=0.24), CFI=0.92, GFI=0.90 and RMSEA=0.02. Therefore, the null hypotheses that our model fit the sample equally well with the full model is not rejected (p=0.24>0.05); the value of RMSEA is less than 0.05 (also, 0.05 does not belong to the 90% confidence interval) while CFI and GFI are greater than 0.90. The regression coefficients of the model (using the GLS estimation method) are all positive and statistical significant (Figure 2). The greatest standardized effects are found from: factor 1 to items 2 and 3, factor 2 to items 16 and 18, factor 3 to items 19 and 24, and factor 4 to item 31. The only no-significant covariances among the four underlying factors are that between factor 1 and factor 3 and 4; the correlations are all positive while this between factor 1 and 2 is the most significant.

Table 2
EFA of "Experiences of Teaching and Learning" (PAF extraction/Promax rotation) and the Correlations Among the 4 Factors.

Item	Pattern[a] Component				Structure[a] Component			
	1	2	3	4	1	2	3	4
1		.629					.544	
2		.600			.403		.664	
3		.513			.522		.643	
5		.588					.533	
6	.507				.617		.449	
10	.575				.503			
11	.645				.580			
12	.511				.551			
13	.547				.543			
14	.508				.567			.371
15	.559				.620			.384
16	.459				.534		.419	
17	.608				.564			
18	.709				.667			
19		.705				.708		
22		.479				.508		
24		.861				.836		
29			.677					.677
30			.440					.483
31			.621					.653
Correlations								
1	1	.252	.494	.275				
2	.252	1	.323	.056				
3	.494	.323	1	.136				
4	.275	.056	.136	1				

[a]. *Loadings below .35 not seen.*

Correlations

Before studying the correlations, it is necessary to confirm the underlying factor structure of the ASSIST in our whole sample (Karagiannopoulou & Milienos, 2013, also studied the psychometric properties of ASSIST on the current population). Previous studies indicated that the subscales "Alertness to Assessment demands" and "Monitoring effectiveness" fail to load appropriately on the strategic approach (Byrne et al., 2004; Diseth, 2001). Our results are in accordance with these findings (i.e., "Alertness to assessment demands" loads on the surface approach, and "Monitoring effectiveness" has low cross-loadings on the deep and strategic approach). Consequently, we excluded these two subscales from the analysis. Hence, the descriptive fit indices of our model are the following: Chi-square=134.83 (df=41, $p<0.01$), CFI=0.90, GFI=0.93, and RMSEA=0.08. Most of these indices lie in acceptable intervals, whereas RMSEA reveals a poor fit on our data.

Table 3 indicates the Pearson correlation coefficient among the subscales (composite scores) of the instruments used in the present study. Note that this table includes all of the correlations between the four subscales of ETL and the rest of the variables used in the present study. Hence, it can be seen (Table 3) that the great majority of the observed correlations are positive; the most significant positive correlations are found among the subscale, "Teaching for understanding and encouraging learning," and the majority of the deep and strategic subscales and the two variables depicting "knowledge" and "generic skills" acquired. Besides, of similar sizes are the correlations between "Integrative learning and critical thinking" and one deep (interest in ideas) and one strategic (achieving) subscale and the two estimated outcomes, "knowledge" and "generic skills" acquired. Besides, "Congruence and coherence in course organization" give a positive correlation with "Knowledge acquired"; "Support from other students" is only similarly highly correlated with "generic skills" acquired. On the other hand, the most significant negative correlations are among the four subscales of students' perceptions of the teaching-learning environment and the surface subscale "Lack of purpose."

Table 3
Pearson Correlations

	Seeking Meaning	Relating Ideas	Use of Evidence	Interest in ideas	Organized studying	Time management	Achieving	Lack of purpose
Congruence and coherence in course organization	.141**	.160**	.111*	.190**	.29**	.299**	.219**	-.256**
Teaching for understanding and encouraging learning	.239**	.378**	.351**	.311**	.306**	.313**	.328**	-.284**
Support from other students	.082	.121*	.129*	.085	.101	.077	.216**	-.001
Integrative learning and critical thinking	.254**	.271**	.250**	.303**	.262**	.260**	.289**	-.295**

	Unrelated memorising	Syllabus boundness	Fear of Failure	Self evaluation	Deep	Strategic	Surface	Knowledge acquired	Generic skills acquired
Congruence and coherence in course organization	-.187**	-.102	-.113*	.205**	.203**	.311**	-.248**	.327**	.241**
Teaching for understanding and encouraging learning	-.035	-.071	.064	.120*	.410**	.366**	-.128*	.475**	.338**
Support from other students	.002	.051	.002	-.014	.146**	.144**	.015	.185**	.399**
Integrative learning and critical thinking	-.132*	-.066	.059	.083	.340**	.317**	-.159**	.390**	.297**

*p<0.05, **p<0.01

Discussion

The study explores the factor structure of the "Experiences of Teaching and Learning" questionnaire in a specific course context. It sheds light on the validation of it using the ASSIST at subscale level, as a robust instrument that explores approaches to learning in full. The findings indicate a four-factor solution: "Congruence and coherence in course organization," "Teaching for understanding and encouraging learning," "Support from other students," and "Integrative learning and critical thinking." The factors are similar to previous studies that report six factors (Entwistle, 2009; Parpala et al., 2013); we have to point out that for the sake of face validity, the current study has not taken into account "Constructive feedback." Not surprisingly, "Teaching for understanding and encouraging learning" comprises of items involving both "teaching for understanding" and "staff enthusiasm and support."

Moreover, the study gives indications of sufficient convergent and criterion validity of the "Experiences of Teaching and Learning." It suggests relations between its four factors and (a) ASSIST subscales and (b) acquired knowledge and generic skills, as well as self-evaluation (two parts of the ETLQ). The four-factor structure of the inventory, the strong and weak items, the patterns of relations with approaches to learning, relations to acquired knowledge and generic skills, and self-evaluation are closely similar to those obtained in other cultures (Hui & Triandis, 1985; Parpala et al., 2013; Xu, 2004). Also, the four factors give similarly high reliability coefficients with those reported in previous studies (McCune, 2003; Steis et al., 2012). The "Experiences of Teaching and Learning" can be

seen as a high context sensitive instrument for use across cultures; most of the items that did not contribute to the model "meet" integral aspects of teaching, assessment, and learning that involve demands about which students seemed to be unclear (Karagiannopoulou, 2010; Karagiannopoulou & Entwistle, 2013). Also, the condensed category, "Teaching for understanding and encouraging learning," that brings together items from "Teaching for understanding" and "Staff enthusiasm and support," is in line with previous findings (Karagiannopoulou, 2010; Karagiannopoulou & Entwistle, 2013, 2015).

The use of a subscale rather than a scale level to measure approaches to learning allowed us to shed light on aspects of convergent validity of the ETL in terms of the relations between its four factors and the set of variables included in the present study which disappear in the correlation set at scale level. The four factors of the ETL give quite strong significant associations only with a single surface subscale "lack of purpose," whereas there are only few weak correlations with the rest of the subscales of the surface approach. Such a finding possibly depicts the psychometric weakness of the surface scale. A range of studies report lower reliability of the surface scale (see Asikainen et al., 2014; Gijbels, 2005; Karagiannopoulou & Christodoulides, 2009; Karagiannopoulou & Milienos, 2015) and weak loadings of some of its subscales (Entwistle et al., 2001). Moreover, the few strong relations of "support from other students" with "achieving" (strategic subscale), and generic skills possibly depict an instrumental use of such a relation with peers rather than a real cooperation with peers (Lindblom-Ylänne, 2003). The use of subscales for the validation of the ETL sheds light on the relations between perceptions of the teaching-learning environment, learning motives, and processes. Not surprisingly, the less strong correlations involve links between the four factors of the "Experiences of Teaching and Learning" and the intention/motives for studying—namely seeking meaning, achieving, and fear of failure—for deep, strategic, and surface approach, respectively. Besides, the stronger correlations involve the relevant processes (the rest subscales comprising the deep and strategic scales but not the surface), which can be seen as reactions to teaching.

Items that Failed to Remain in the Model

The analysis supports the validity of the ETL as a context sensitive instrument. The items that failed to remain in the model refer to "obscure" aspects of the particular course. Some of the items do not load on any factor (items 4, 7-9, 20, 21, 23), and some give low loadings (items 25-28). In particular, the failure of items 20, 21, 23 and 25, that concern enjoyment and interest, to load on any factor may indicate that these items are of a quite different kind. They can be seen as more to do with students as individuals rather than as reactions to the teaching they have experienced. Also, questions 27 (I could see how the set work fitted in with what we were supposed to learn) and 28 (You had really to understand the subject to get good marks in most of the courses) concerned assessment. The failure of these items to contribute to the model may well be interpreted as a consequence of students' unclear perceptions of exam demands and inconsistency between teaching and assessment (Karagiannopoulou, 2010; Karagiannopoulou & Entwistle, 2013; Karagiannopoulou & Milienos, 2013). In line with this interpretation about students' unclear perceptions of what they were supposed to learn, question 4 (What we were taught seemed to match what we were supposed to learn), question 8 (On most of the courses, I was prompted to think about how well I was learning and how I might improve), question 9 (Staff tried to share their enthusiasm about the subject with us) and question 26 (The handouts and other materials we were given helped me to understand the courses), focused on teaching and learning, do not load on any factor. Question 7 (I can imagine myself working in the subject area covered by the courses I have been taught) may be seen as irrelevant because this particular joint degree does not correspond well to the labor market. Students may have difficulty in seeing the relevance of the material and the contribution of teaching to their improvement as students. Besides, the variation of experiences among course modules may make it difficult for students to answer questions posed on a more general level (concerning the whole range of courses they have taken).

In our study the factor, "Teaching for understanding and encouraging learning," brings together items from "Teaching for understanding" and "Staff enthusiasm and support": two factors presented as separate in previous studies (Entwistle, 2009; Parpala et al., 2013). Items 25 and 27 (in the original version/ 16 and17 in our version) seem to be strong items loading on "Staff enthusiasm and support" in Parpala et al. (2013), Herrmann et al. (2016), and Entwistle's (2009) studies. These items plus items 22 (in the original version/ 20 in our version) (Xu, 2004) and 28 (in the original version/ 18 in our version) (McCune, 2003; Xu, 2004) that originally loaded on "stuff enthusiasm and support" (see also Parpala et al. 2013) load on "teaching for understanding and integrating learning" in our study. Herrmann et al. (2016) supported this finding. They reported that the item "the staff helped us to see how we are supposed to think and reach conclusions in this subject" loaded on "staff enthusiasm and support" while on "teaching for understanding" in Parpala's study. Recent studies indicate that good teaching relates to the teacher's enthusiasm. A "meeting of minds"—as a relational experience where students' experiences with enthusiastic

tutors who teach for understanding, value their views, and show concern about their development—has been found to come along with deep learning and personal understanding (Karagiannopoulou & Entwistle, 2013, 2015; Rowe, Fitness, & Wood, 2013). Although the questions excluded after the analysis were many, the number of items (20 items) included in our version is similar to that suggested by previous studies (21 items with Herrmann et al., 2016; Parpala et al., 2013) and also to the 25-item version used by Steis et al. (2012). Also, most of the 20 items that remained in the version presented in the present study are strong items that appear in a most recent version of the "Experiences of Teaching and Learning" (15 items, Entwistle, 2009). Items 22, 25, 27, 28 (in our version) appear in most versions (Herrmann et al., 2016; Parpala et al., 2013). Drawing on both our study and Parpala et al. (2013) study, we suggest that questions 9 (I could see the relevance of what we were taught in this course unit) and 28 (You had really to understand the subject to get good marks in this course unit; see items 11 and 34 in the original version/ 9, 28 in our version) are weak items. In consistency with Parpala et al. (2013) and Entwistle (2009), these items failed to remain in our version.

Associations with Approaches to Learning, Knowledge and Skills Acquired, and Self-Evaluation

In our attempt to support the validation of the "Experiences of Teaching and Learning," approaches to learning were not explored by the relevant inventory (ALSI) included in the ETLQ but by its full version, ASSIST. The subscales comprising each approach allowed us to get a more complete picture of the associations between the academic context and the particular elements of deep, strategic, and surface approaches in a sample of students who were not familiar with course evaluation. The convergent validity of the ETL was supported by consistent statistically significant positive and negative correlations between most of its factors and (a) the subscales included in the deep and strategic scales and (b) the only one surface subscale (lack of purpose), respectively (Entwistle et al., 2003; Parpala et al., 2013; Xu, 2004). The study reveals expected positive associations with deep and strategic subscales. However, the strong pattern of associations between only one surface subscale, namely, lack of purpose, and the four factors included in the "Experiences of Teaching and Learning" possibly reveal the problematic structure of the scale (Asikainen et al., 2014) and the difficulties in the interpretation of the surface scale. The relevant literature suggests that the items describing the surface scale are of two kinds, "memorizing" and "lack of purpose." Lack of purpose depicts an implicit negative motive (personal communication with Noel Entwistle, 1st of August 2017). Thus, the perceptions of the teaching environment may impact students' implicit motive, namely, lack of purpose, but fail to have an effect on the processes, such as unrelated memorizing employed by students, on their attitudes, such as syllabus-boundness, and on motivation, such as fear of failure. Such suggestions are in line with the stable dimension of approaches (see Karagiannopoulou & Milienos, 2013).

The study supports previous findings that associations between "support from other students" and approaches to learning comprise a less statistically significant set of correlations (see Entwistle et al., 2003; Parpala et al., 2013). However, we found a strong correlation between "support from other students" and students' motivation to achieve (strategic subscale) and also very low correlations between "support from other students" and all of the deep and strategic subscales. Such associations possibly indicate that students are more likely to depend on other students than "to be truly promoted by a real" cooperation with peers (Lindblom-Ylänne, 2003). The findings support the validity of the instrument to the extent that they are supported by studies in the SAL tradition. Moreover, the correlations identified do not indicate causal relations but only associations. The "Teaching for understanding and encouraging learning" is the environmental subscale that gives the strongest sets of correlations, with most of the deep and strategic subscales and the strongest negative correlation with "lack of purpose" (surface subscale). The next strongest factor is "Integrative learning and critical thinking" (Entwistle et al. 2003; Karagiannopoulou & Milienos, 2013; Parpala et al. 2013).

Further support to the validation of the "Experiences of Teaching and Learning" is brought by the associations between its four factors and the other sections included in the ETLQ that involve estimated learning outcomes and student's self-evaluation. The study indicates a quite strong pattern of associations between almost all of the four perceptions of the teaching-learning environment and "Knowledge" and "Generic skills" acquired. This is inconsistent with previous studies (Entwistle et al., 2003; Xu, 2004), which suggest such strong correlations only for "Teaching understanding and encouraging learning." Besides, support to the "Experiences of Teaching and Learning" as a context sensitive instrument comes from higher correlation between self-evaluation and "congruence and coherence" (most of the items in this factor involved even implicitly the learning required for exam success). Both of the above sets of associations are well supported by a previous study indicating the contribution of "congruence and coherence" and "teaching for understanding" to achievement through the deep and surface approaches (Karagiannopoulou & Milienos, 2015).

Limitations and Future Research

Although the present study is not a large-scale study and our sample comes from a particular department, the study supports the appropriateness of the use of the

"Experiences of Teaching and Learning" in the current Greek sample as a context-sensitive instrument. The range of correlations between aspects of the academic environment and elements of approaches depicted in the relevant subscales seem to keep alive the discussion about the subscales comprising each approach as conceptual entities that provide a more detailed picture of students' learning. Future research towards the development of a version of "Experiences of Teaching and Learning" with general value would be useful to focus on associations with elements (depicted in subscales) of the approaches in which perceptions of the teaching-learning environment have an impact, improving also the validity of the surface scale. This proposal draws on Trigwell and Prosser's suggestion that experiences of the teaching-learning environment and approaches are aspects of the same underlying phenomenon and so are simultaneously present in students' awareness (Trigwell & Prosser, 1991a, 1991b). A focus on failure of perceptions of the teaching-learning environment to relate to particular elements of the surface approach sheds light on the ongoing discussion about students having developed a particular approach by the time they enter the university (Asikainen et al., 2014; Asikainen & Gijbels, 2017), which hardly changes in the course of their study. It is suggested that the "Experiences of Teaching and Learning" (the second section of the ETLQ) offers a valuable instrument that measures students' perceptions of the teaching-learning environment, although its psychometric properties have to be tested in different contexts; some items are likely to fail to contribute to particular versions in different contexts. However, most of the studies so far have led to shortened versions but not to "amended" items supporting the face and content validity of them. Future research may be directed towards the use of item-relation analysis, instead of correlation designs, for the development of a short version of ETL with general value.

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EVANGELIA KARAGIANNOPOULOU is Associate Professor of Educational Psychology at the University of Ioannina, Greece. She is Associate Fellow of the British Psychological Society (AFBPsS). Her main research interests concern University students' learning and understanding, learning environment, student-tutor relationship, academic emotions and emotion regulation. She has published a number of book chapters and articles in international journals.

FOTIOS S. MILIENOS is Lecturer in Statistics, at the University of Ioannina, Greece. His research interests include cure rate models, start-up demonstration test, pattern waiting times and scan statistics.