ADAPTATION OF THE COURSE EXPERIENCE QUESTIONNAIRE TO A PORTUGUESE HIGHER EDUCATION INSTITUTION

ADAPTAÇÃO DO QUESTIONÁRIO DE EXPERIÊNCIA DO CURSO A UMA INSTITUIÇÃO DE ENSINO SUPERIOR PORTUGUESA

ADAPTACIÓN DEL CUESTIONARIO DE EXPERIENCIA DEL CURSO A UNA INSTITUCIÓN DE EDUCACIÓN SUPERIOR PORTUGUESA

Luís Afonso[1] [0000-0003-4032-7019]

Jorge Mendonça[2] [0000-0002-8359-139X]

Carla Pinto[3] [0000-0002-0729-1133]

Lurdes Babo[4] [0000-0001-5090-8736]

[1]*ISEP, Polytechnic of Porto, Portugal, lma@isep.ipp.pt*

[2]*ISEP& SIIS, Polytechnic of Porto, Portugal, jpm@isep.ipp.pt*

[3]*ISEP, Polytechnic of Porto & CMUP, Portugal, cap@isep.ipp.pt*

[4]*ISCAP & CEOS.PP & SIIS, Polytechnic of Porto, Portugal, lbabo@iscap.ipp.pt*

Abstract

The Course Experience Questionnaire has emerged in Australia, in 1981, to evaluate the teaching quality of certain degree programs. Since then, it has been applied in different countries and Higher Education Institutions (HEIs).

In this work, the original questionnaire, consisting of 36 Likert-scale questions, was reproduced at Moodle, and data was gathered from 84 respondents. The sample was taken from the population of students attending the Probability and Statistics course, in the first semester of 2022/2023, of the Bachelor degree of Electric and Computer Engineering at the School of Engineering of the Polytechnic University of Porto. The data was analyzed using Factor Analysis. From the 36 questions, was selected a set of 23 questions, which deemed appropriate for the Portuguese engineering context. These prompted the identification of four relevant dimensions/factors for evaluating HEI's quality: Generic skills, Teaching professionality, Appropriate workload, and Appropriate assessment. The results were presented in an informative graph, allowing for a clear and concise visualization of the overall teaching evaluation of the curricular unit of Probability and Statistics.

We remark that this research was solely directed to that specific students' population, thus, we should be cautious when generalizing. This is, however, a case study which might contribute to the development of a useful tool for HEI's evaluation and the improvement of Engineering Education's quality in Portugal. Furthermore, it highlights the importance of adapting evaluation tools to specific institutional contexts, namely, in Portugal.

Keywords: course experience questionnaire, higher education, engineering education.

Resumo

O *Course Experience Questionnaire* surgiu na Austrália, em 1981, com o objetivo de avaliar a qualidade das experiências de aprendizagem dos estudantes no ensino superior. Desde então, tem sido aplicado em diferentes países e Instituições de Ensino Superior (IES).

Neste trabalho, o questionário original, constituído por 36 questões de escala de Likert, foi reproduzido no Moodle, obtendo-se 84 respostas. A amostra foi retirada da população de alunos que frequentaram a unidade curricular de

Probabilidades e Estatística, da Licenciatura em Engenharia Eletrotécnica e de Computadores, do Instituto Superior de Engenharia do Politécnico do Porto, no primeiro semestre de 2022/2023. Os dados foram analisados usando Análise Fatorial, identificando-se quatro dimensões/fatores relevantes para a avaliação da qualidade das IES: Competências genéricas, Profissionalismo docente, Carga horária adequada e Avaliação adequada. Os resultados são apresentados num gráfico informativo, permitindo uma visualização clara e concisa da avaliação global da unidade curricular de Probabilidades e Estatística.

Salientamos que esta investigação foi desenhada apenas para esta população específica de alunos, pelo que devemos ser cautelosos nas generalizações. Trata-se, no entanto, de um estudo de caso que poderá contribuir para o desenvolvimento de um instrumento útil para a avaliação das IES e para a melhoria da qualidade do ensino da Engenharia em Portugal. Para além disso, este trabalho salienta a importância de adaptar instrumentos de avaliação a contextos institucionais específicos, nomeadamente, em Portugal.

Palavras-chave: course experience questionnaire, ensino superior, ensino de engenharia.

Resumen

El *Course Experience Questionnaire* surgió en Australia, en 1981, con el objetivo de evaluar la calidad de las experiencias de aprendizaje de los estudiantes en la enseñanza superior. Desde entonces, se ha aplicado en diferentes países e Instituciones de Educación Superior (IES).

En este trabajo, el cuestionario original, compuesto por 36 preguntas en escala Likert, fue reproducido en Moodle, obteniéndose 84 respuestas. La muestra se extrajo de la población de estudiantes que asistieron a la unidad de curso Probabilidades y Estadística de la Licenciatura en Ingeniería Eléctrica e Informática del Instituto Superior de Engenharia do Politécnico do Porto en el primer semestre de 2022/2023. Los datos se analizaron mediante Análisis Factorial, identificando cuatro dimensiones/factores relevantes para evaluar la calidad de las IES: Competencias genéricas, Profesionalidad docente, Carga de trabajo adecuada y Evaluación adecuada. Los resultados se presentan en un gráfico informativo, que permite una visualización clara y concisa de la evaluación global de la unidad curricular Probabilidades y Estadística.

Subrayamos que esta investigación se diseñó únicamente para esta población específica de estudiantes, por lo que debemos ser cautos en las generalizaciones. Se trata, sin embargo, de un estudio de caso que puede contribuir al desarrollo de un instrumento útil para la evaluación de las IES y para la mejora de la calidad de la enseñanza de la Ingeniería en Portugal. Además, este trabajo pone de manifiesto la importancia de adaptar los instrumentos de evaluación a contextos institucionales específicos, como es el caso de Portugal.

Palabras-clave: course experience questionnaire, enseñanza superior, enseñanza de la ingeniería.

INTRODUCTION

For many years, student evaluation of teaching has been widely used to gauge the effectiveness of their instruction. One of the most well-established tools for gathering university students' feedback on teaching is the Course Experience Questionnaire (CEQ). The CEQ was developed by Paul Ramsden, an educational researcher and professor at the University of Queensland, Australia. Ramsden initially developed the CEQ in the 1980s as part of his doctoral research to assess the quality of teaching and learning in higher education (Ramsden, 1991).

The validity and reliability of the CEQ are crucial to its success as a valuable tool for assessing the quality of higher education. The CEQ is used by many universities and colleges to collect feedback from students about their academic experience, including the quality of teaching, course materials and overall satisfaction. The importance of the effectiveness and reliability of the CEQ lies in its ability to provide accurate and meaningful information that can guide institutional decision-making and improve the quality of education. Higher education institutions with better rankings are more likely to attract students and to remain competitive in the education industry.

Researchers have examined the multidimensional nature of the CEQ and its underlying factors. Studies have investigated the factor structure and the validity of the different scales, such as good teaching, clear goals and standards, appropriate assessment, student–staff interaction, supportive learning environment, and generic skills.

The purpose of this article is to evaluate the effectiveness and reliability of the CEQ as a tool for assessing teaching quality and effectiveness in a specific higher education institution in Portugal. The article seeks to analyze the CEQ data collected from students and determine whether the questionnaire is a valid and reliable measure of teaching quality and effectiveness, and whether it can provide useful feedback to teachers and institutions for improvement. The study also aims to identify areas of strength and weakness in the teaching and learning environment and to make recommendations for improvement based on students' feedback.

The paper is organized as follows: after the present introduction, the background of the study is described in section 2, followed by the methodology in section 3. The performed statistical analysis and the main results are discussed in section 4. Finally, the main conclusions and limitations of the study are presented in the closing section.

1 LITERATURE REVIEW

The CEQ, which has been used as a tool to obtain student evaluations of teaching for many years, is a well-established instrument all over the world. Initially designed to measure teaching quality at the level of study program or degree, it has evolved to also assess currently enrolled students' perceptions of teaching quality across universities (Ginns et al., 2007; Ramsden, 1991). The CEQ has been widely used to assess the quality of university education in Canada, Ireland, China, Italy, Japan, Chile, the Netherlands, Malaysia, Bangladesh and Greece (Asonitou et al., 2018). The Lund University in Sweden has used CEQ since 2004 (Warfvinge et al., 2022).

The CEQ has been used to explore the relationships between teaching quality and student satisfaction, examining how different dimensions of teaching, such as clarity, organization, enthusiasm, and lecturer expertise, influence students' overall satisfaction with their course experiences (Ramsden, 1991; Richardson, 1994; Wilson et al., 1997). It has been investigated the impact on student learning through the relationship between the course experiences captured by the CEQ and student learning outcomes (Yusof et al., 2019). These studies explore how the quality of teaching, engagement in learning, and how supportive learning environments influence students' acquisition of knowledge and skills.

Several other researchers have applied and adapted the CEQ to better fit their needs. Some adaptations and modifications of the CEQ have been done in order to suit specific research contexts and objectives. Some studies have incorporated additional items or modified existing scales to capture additional dimensions or refine the instrument for specific purposes (Kreber, 2003; Ullah et al., 2011). (Yin et al., 2022) adapted the CEQ questionnaire in the context of online teaching and learning during COVID-19 pandemic and concluded that CEQ is a valid and reliable instrument for evaluating the quality of online teaching. Others have expanded upon the original questions to gather more detailed feedback from students (Ginns et al., 2007). Furthermore, certain investigations have utilized the questionnaire to draw comparisons under specific circumstances. For example, (Warfvinge et al., 2022), compare students' self-reported experiences in traditional campus-based teaching and emergency remote teaching during the COVID-19 pandemic.

Cross-cultural studies comparing students' experiences and satisfaction with courses in different countries and educational settings seek to understand cultural variations in teaching and learning practices and their impact on students' perceptions (Fryer et al., 2012; Ginns et al., 2007; Thien & Ong, 2016).

Various versions of the CEQ exist in the literature, with the 36-item CEQ validated by (Wilson et al., 1997) being the most comprehensive. This version measures students' perceptions of six dimensions of university teaching: clear goals and standards, generic skills, emphasis on independence, good teaching, appropriate workload, and appropriate assessment. The CEQ is based on a theory of university teaching and learning that recognizes the curriculum, instruction, and assessment as key factors influencing students' approaches to learning and the quality of their learning outcomes (Lizzio et al., 2002; Wilson et al., 1997). Previous studies have extensively examined the relationships between students' course experiences and their approaches to learning or learning outcomes. Generally, these studies consistently found that perceptions of good teaching, clear goals and standards, emphasis

on independence, and generic skills are associated with deep approaches to learning, while heavy workloads and inappropriate assessment are linked to a surface approach to learning (Diseth, 2007; Yin et al., 2016).

In the sake of completeness, we note that some studies found that CEQ factors exhibited low Cronbach's alpha values (Ali & Mohd Dodeen, 2021; Thien & Ong, 2016). Moreover, exploratory or confirmatory analyses conducted by these studies failed to support the original factor structure of the CEQ (Thien & Ong, 2016; Webster et al., 2009). These measurement problems may be partly attributed to cultural differences between countries (Law & Meyer, 2011).

2   METHODS

In January 2023, a survey questionnaire was conducted to collect the data. A total of 238 undergraduate students from the Probability and Statistics, of a Bachelor Degree in Electrical Engineering, participated in the survey on a voluntary basis. The valid sample comprised 84 respondents.

A long version of the CEQ with 36 items was posed to the students. The students replied through a five-point Likert scale, according to their level of agreement, namely (1) Strongly Disagree; (2) Disagree; (3) Neither Agree nor Disagree; (4) Agree; (5) Strongly Agree. The posed questions are related with 6 domains: Good Teaching, with 8 items measuring the effort of the teacher on the increase of students' motivation; Clear Goals and Standards, consisting of 5 items, assessing students' perception of the program goals; Generic Skills, with 6 items evaluating the development of students' analytic skills; Appropriate Assessment, composed of 6 items gauging students' perceptions regarding the adequacy of applied assessment methods; Appropriate Workload, comprising 5 items focusing on students' perceptions concerning the overall academic work done in the course; and Emphasis on Independence, in which 6 items evaluate the academic independence of the students.

Statistical analysis was performed with descriptive statistics and an exploratory factor analysis. The appropriateness of factor analysis was validated by Kaiser-Meyer-Olkin (KMO) and Bartlett sphericity tests.

3   RESULTS

Exploratory factor analysis was applied to the 36 items of the original CEQ tool (Ramsden, 1991). The values obtained for the KMO (0.837) and Bartlett test of sphericity ($X2 = 781.981$, $p<0.001$) revealed appropriate.

We didn't consider factor loadings lower than 0.5 (Hair, 2011). Four factors were extracted, which explained 64.58% of the variance. From the Generic Skills' dimension, 5 items were loaded on the factor 1 (explained variance =35,72%). Factor 2 was loaded on 5 items from Good Teaching dimension (explained variance = 10.60%). We renamed this factor as Teaching Professionality. Factor 3 (explained variance=9.94%) was composed by 5 items from the Appropriate Workload scale, and Factor 4 (explained variance = 8.33%) consisted of 4 items from the Appropriate Assessment dimension. In order to check the internal consistency of the survey, we computed Cronbach's alpha coefficient and Pearson product correlation (Table 1). The internal consistency of the domains, measured by Cronbach's coefficient alpha, is generally satisfactory.

It was observed that Generic Skills is significantly positive with Teaching Professionality and significantly negative with Appropriate Assessment. Cronbach's alpha ranged between 0.69 for Appropriate Assessment domain, and 0.87 for Generic Skills (Table 2).

The mean score of Teaching Professionality was 3.28, which highlights a positive perception about the quality of teaching, although not followed by the Appropriate Assessment domain, with a mean score of 2.77. The Generic Skills domain, with a mean score of 3.20, revealed that students felt they developed their skills regarding problem-solving and communication (Figure 1).

Table 1

Reliability and correlation analysis

	Teaching Professionality	Generic Skills	Appropriate Workload	Cronbach alpha	Mean	Standard Deviation
Teaching Pprofessionality	----			0.88	3.28	0,56
Generic Skills	0.54**	----		0.87	3.20	0.75
Appropriate Workload	0.06	–0.12	----	0.78	3.02	0.54
Appropriate Assessment	–0.35**	–0.16	0.11	0.69	2.77	0.73

*Correlation is significant at the 0,05 level (2-tailed); **Correlation is significant at the 0,01 level (2-tailed)

Figure 1

Distributions of the domains

Table 2

Reliability from (Asonitou et al., 2018; Ramsden, 1991; Richardson, 1994) and the present study

Scale	(Ramsden, 1991)	(Richardson, 1994)	(Asonitou et al., 2018)	Present study
Teaching Professionality (Good Teaching)	0,87	0,79	0,78	0,88
Generic Skills	-----	----	0,78	0,87
Appropriate Workload	0,77	0,71	----	0,78
Appropriate Assessment	0,71	0,47	0,54	0,69

CONCLUSIONS AND REMARKS

In this study we analyzed the results of a CEQ, posed to students, attending a Probability and Statistics course, in a bachelor degree, at the School of Engineering, Polytechnic University of Porto.

The data was analyzed statistically, by means of descriptive statistics and exploratory factor analysis. The appropriateness of factor analysis was validated by (KMO, 0.837) and (Bartlett sphericity, X2 = 781.981, p<0.001) tests. The findings from the exploratory factor revealed four dimensions, namely: Generic Skills, Teaching Professionality, Appropriate Workload, and Appropriate Assessment. The internal consistency of the survey was generally satisfactory. Cronbach's alpha ranged between 0.69 for Appropriate Assessment dimension, and 0.87 for Generic Skills.

We also observed certain statistically significant relations, in particular, a positive relation between Generic Skills and Teaching Professionality, and a negative relation between Generic Skills and Appropriate Assessment. The mean scores were high for Teaching Professionality and Generic Skills, suggesting a positive perception about the quality of teaching, and acknowledgment of the development of problem-solving and communication skills. Nevertheless, this did not translate in high mean scores for the Appropriate Assessment dimension, with a lower mean score.

The reliability of the current study agrees with the ones of published studies from (Asonitou et al., 2018; Ramsden, 1991; Richardson, 1994). This encourages future CEQ surveys in other degrees and other Portuguese HEI's, which may lead to an improved quality of Engineering Education in Portugal. Furthermore, it also propounds the adaptation of evaluation tools to specific institutional contexts.

The main impediments of this study, preventing its generalization, are the sample, withdrawn from a specific bachelor degree, and a particular course, and the low response rate (around 35%).

ACKNOWLEDGMENTS

REFERENCES

Ali, H., & Mohd Dodeen, H. (2021). An adaptation of the course experience questionnaire to the Arab learning context. *Assessment & Evaluation in Higher Education*, *46*(7), 1104–1114.

Asonitou, S., Mandilas, A., Chytis, E., Latsou, D., & others. (2018). A Greek evaluation of the course experience questionnaire: Students' conceptions of the teaching quality of higher education accounting studies. *International Journal of Business and Economic Sciences Applied Research (IJBESAR)*, *11*(2), 51–62.

Diseth, Å. (2007). Approaches to learning, course experience and examination grade among undergraduate psychology students: Testing of mediator effects and construct validity. *Studies in Higher Education*, *32*(3), 373–388.

Fryer, L. K., Ginns, P., Walker, R. A., & Nakao, K. (2012). The adaptation and validation of the CEQ and the R-SPQ-2F to the Japanese tertiary environment. *British Journal of Educational Psychology*, *82*(4), 549–563. https://doi.org/10.1111/j.2044-8279.2011.02045.x

Ginns, P., Prosser, M., & Barrie, S. (2007). Students' perceptions of teaching quality in higher education: The perspective of currently enrolled students. *Studies in Higher Education*, *32*(5), 603–615.

Hair, J. F. (2011). Multivariate data analysis: An overview. *International Encyclopedia of Statistical Science*, 904–907.

Kreber, C. (2003). The relationship between students' course perception and their approaches to studying in undergraduate science courses: A Canadian experience. *Higher Education Research & Development*, *22*(1), 57–75.

Law, D. C. S., & Meyer, J. H. F. (2011). Relationships between Hong Kong students' perceptions of the learning environment and their learning patterns in post-secondary education. *Higher Education*, *62*(1), 27–47. https://doi.org/10.1007/s10734-010-9363-1

Lizzio, A., Wilson, K., & Simons, R. (2002). University students' perceptions of the learning environment and academic outcomes: implications for theory and practice. *Studies in Higher Education*, *27*(1), 27–52.

Ramsden, P. (1991). A performance indicator of teaching quality in higher education: The Course Experience Questionnaire. *Studies in Higher Education*, *16*(2), 129–150.

Richardson, J. T. E. (1994). A British evaluation of the course experience questionnaire. *Studies in Higher Education*, *19*(1), 59–68.

Thien, L. M., & Ong, M. Y. (2016). The applicability of course experience questionnaire for a Malaysian university context. *Quality Assurance in Education*, *24*(1), 41–55. https://doi.org/10.1108/QAE-08-2014-0041

Ullah, R., Richardson, J. T. E., & Hafeez, M. (2011). Approaches to studying and perceptions of the academic environment among university students in Pakistan. *Compare*, *41*(1), 113–127.

Warfvinge, P., Löfgreen, J., Andersson, K., Roxå, T., & Åkerman, C. (2022). The rapid transition from campus to online teaching–how are students' perception of learning experiences affected? *European Journal of Engineering Education*, *47*(2), 211–229.

Webster, B. J., Chan, W. S. C., Prosser, M. T., & Watkins, D. A. (2009). Undergraduates' learning experience and learning process: Quantitative evidence from the East. *Higher Education*, *58*, 375–386.

Wilson, K. L., Lizzio, A., & Ramsden, P. (1997). The development, validation and application of the Course Experience Questionnaire. *Studies in Higher Education*, *22*(1), 33–53.

Yin, H., Lu, G., & Meng, X. (2022). Online course experiences matter: adapting and applying the CEQ to the online teaching context during COVID-19 in China. *Assessment & Evaluation in Higher Education*, *47*(8), 1374–1387.

Yin, H., Wang, W., & Han, J. (2016). Chinese undergraduates' perceptions of teaching quality and the effects on approaches to studying and course satisfaction. *Higher Education*, *71*, 39–57.

Yusof, R., Yin, K. Y., Ahmad, A. S., Halim, H., & Norwani, N. M. (2019). Students course experience: Reflections of outcome-based education implementation in accounting programmes in higher education. *International Journal of Academic Research in Progressive Education and Development*, *8*(2), 228–238.