European Journal of Health Research
2019, Vol. 5, Nº 1 (Págs. 31-38)

e-ISSN 2445-0308 // www.ejhr.es
doi: 10.30552/ejhr.v5i1.135

Learning procedures in occupational medicine topics and workload perceived by students

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The European Higher Education Area is especially concerned with the way teaching is performed at graduate and postgraduate levels. It is a matter or research with a special interest in areas such as those that belong to Health Sciences disciplines. How the students learn is related to the strategies they use to approach to the contents to be assimilated. The goal of this study is to know students' perception and learning approaches in occupational medicine modules. Students enrolled in an occupational medicine module of active learning filled the *Course Experience Questionnaire* (CEQ) and the *Study Process Questionnaire* (R-SPQ-2F). Workload perception and learning approaches and their relationship were analyzed. Students showed consistent appropriateness scores and showed a significantly higher deep than surface approach (R-SPQ-2F) with a relationship between both. The findings support that with active learning procedures, there is an appropriateness in workload perception and students' deep approach. To ameliorate teaching tools it is suggested to implement research assessment systems to check adequacy of active learning systems.

Keywords: Learning, occupational medicine, perceived workload.

Procedimientos de aprendizaje en medicina del trabajo y carga percibida. Hay una especial preocupación en el Espacio Europeo de Educación Superior por la forma en que la enseñanza se realiza en los niveles de posgrado y posgrado. Es un tema de especial interés en áreas como las que pertenecen a las disciplinas de Ciencias de la Salud. La forma en que los estudiantes aprenden está relacionada con las estrategias que utilizan para acercarse a los contenidos que deben asimilar. El objetivo de este estudio es conocer los enfoques de percepción y aprendizaje de los estudiantes en módulos de medicina del trabajo. Estudiantes de un módulo de aprendizaje activo en medicina del trabajo cumplimentaron el *Cuestionario de Experiencia del Curso* (CEQ) y el *Cuestionario del Proceso de Estudio* (R-SPQ-2F). Se analizaron tanto la percepción de la carga de trabajo como los enfoques de aprendizaje y su relación. Los estudiantes mostraron puntuaciones de adecuación consistentes y mostraron un enfoque de profundidad significativamente más alto que el superficial (R-SPQ-2F) existiendo una relación entre ambos. Los hallazgos confirman que existe una adecuación en la percepción de la carga de trabajo y el enfoque profundo de los estudiantes. Para mejorar las herramientas de enseñanza, se sugiere implementar sistemas de evaluación de la investigación y así verificar la idoneidad de los sistemas de aprendizaje activo.

Palabras Clave: Aprendizaje, medicina del trabajo, carga percibida.

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The European Higher Education Area is especially concerned with the way teaching is performed at graduate and postgraduate levels. It is a matter of research with a special interest in areas such as those that belong to health sciences disciplines due to the direct application by students of the acquired knowledge. This is of special interest when illnesses are related to human occupation, as adult human beings spend a high amount of time in activities related to the working environment. How the students learn is related to the strategies they use to approach to the contents to be assimilated.

The Course Experience Questionnaire is a well-known system to assess students' perception of teaching. It has been working for more than 30 years and was developed at Lancaster University in the 80s (Ramsden, 1991; Richardson, 1994). The first goal was to assess the perception of students concerning teaching quality. From the start, it included five domains that have developed over the years. During these decades some changes have been performed, including changes in the amount and content of items. Different versions have had different goals. The psychometric properties of the Course Experience Questionnaire have been established in different countries (Chaleta, Gracio, Sampaio, Leal, & Silva, 2012; González, Carlos, Montenegro, Helena, & López, 2012; Richardson, 1994). It is of present use in some countries, and as a routine tool in some as in Australia, where it is applied yearly since 1993. For the present study, it has been chosen the Course Experience Questionnaire -23 item version, being a short version validated in English (Wilson, Lizzio, & Ramsden, 1997) and in The Netherlands (Jansen, van der Meer, & Fokkens-Bruinsma, 2013). The other questionnaire to be used in this study, the Study Process Questionnaire, is one of the most studied measures of approaches (strategies and motives) to learning (Biggs, Kember, & Leung, 2001; Mogre y Amalba, 2014; Munshi, Al-Rukban, & Al-Hoqail, 2012; Stes, De Maeyer, & Van Petegem, 2013).

Making use of these two questionnaires, the aim of this study has been to have a first approach to know students workload perception and learning approaches in occupational medicine modules composed of active learning procedures and flipped classroom components.

METHOD

Participants

Fifty-nine university students participated in the study (50 females and 9 males). Their age ranged from 20 to 27 years old (Median=20.11; *S.D*=1.13). They belonged to the Complutense University of Madrid, learning in Health Sciences disciplines. They were involved in an Occupational Medicine module of active learning. All the teaching was inside a required topic for most students, majoring in Occupational Therapy, being elective for the others. The module focused on the age group of workers

and included disease prevention and therapy. The majority of the teaching included active learning procedures -participative groups-.

Instruments

To assess the perceived quality of the teaching related to the occupational medicine module the Course Experience Questionnaire -23 version was used. To assess the study approach of students the Study Process Questionnaire was selected. The Course Experience Questionnaire -23 version was developed and validated, and is one of the most used versions (Wilson et al., 1997). The complete description of items has been extensively described in some research reports (Ramsden, 1991) (Jansen et al., 2013). The Course Experience Questionnaire -23 version includes items with responses in a five-point Likert scale ranging from high disagreement to high agreement.

The Study Process Questionnaire has been also validated (Burnett & Dart, 2000) (Biggs et al., 2001). and as well as the Course Experience Questionnaire -23 it includes items with responses in a five-point Likert scale ranging from high disagreement to a high agreement.

Procedure

The study was conducted during the 2017-18 course period. The questionnaires, translated, were distributed to the students during the teaching term and were part of a broader research study concerning teaching and learning innovation procedures. The students participated voluntarily. They were explained the test questionnaires procedures and goals, as well as they signed an informed consent. They were fully free to ask doubts or retire from the study whenever they wanted. Each participant had assigned an aleatory code, in order to anonymize data, for following the use of filled documents and questionnaires of the study. In this way, the assessment of results is blind, without subject identification.

Data analysis

First of all, an exploration of the appropriate use of the questionnaires was performed. A Spanish version was used for the Course Experience Questionnaire, after checking the psychometric properties, and for the Study Process Questionnaire making use of an already validated version. The Course Experience Questionnaire was translated into Spanish, and an expert fluent in English and Spanish (a researcher in Health Sciences) assessed the content of items. The expert scored each item in order to understand if the translated version was adequate, and also gave recommendations to improve items. Expert scores across items were pooled up and an overall percentage was obtained. An early use of the instrument to a limited group of students allowed to get their opinion as users. After implementing the expert and students' advice the test was used for the total of volunteers.

The Study Process Questionnaire was used as available (Justicia, Pichardo, Cano, Berbén, & De la Fuente, 2008).

The Course Experience Questionnaire validity and reliability was explored for the total of subjects. For items with negative meanings, as referred to in previous studies, the scores were reversed to consistently obtain in coherence with the rest of items higher scores for better teaching evaluations. A factorial analysis was performed. The procedure used a principal-axis factor extraction to explore the factor structure. For this preliminary study, the number of factors to be obtained was determined by the number of principal components whose eigenvalues were greater than one. The Course Experience Questionnaire domains correlation was explored by the correlation among items inside each domain by the Cronbach-α coefficient.

Concerning the Course Experience Questionnaire -23 Workload perception scores (Appropriate Workload domain), assessed for the purpose of perception of teaching quality by students, mean Likert values for each item were calculated for the total of subjects. Concerning the Study Process Questionnaire scores, assessed for the purpose of exploring learning strategies of students, mean Likert values for each item were also calculated (subjects and domains). The Study Process Questionnaire strategies were compared with Wilcoxon signed rank test. The Course Experience Questionnaire -23 Workload perception scores and the Study Process Questionnaire scores relationship was analyzed with the Pearson correlation coefficient (Pearson's r). Descriptive data are shown as means and standard deviations (*S.D*). All statistical analyses were performed with the SPSS-23 for Windows.

RESULTS

The expert informed that the Course Experience Questionnaire had an adequacy of the content of 91±12%, and considered that the items were appropriate. There were no doubts about items meaning, also confirmed by students. A total of 55 students completed both questionnaires. More than 67% of the students agreed that they were satisfied with the course (mean Likert score of 3.31, *S.D*. 0.15). The factor structure of the Course Experience Questionnaire was explored obtaining eigenvalues higher than one in five, which explained 51% of the variance. Principal component analysis gave a derived factor solution corroborating the five factors solution. There was a good internal correlation among items inside each domain with Cronbach-α coefficients higher than six.

Concerning the overall Appropriate Workload domain perception of students on the quality of received teaching the mean Likert values was 3.22, ±0.12. Concerning the Study Process Questionnaire scores, the students showed a significantly higher deep than surface approach. (Z=-2.9; p<0.05; Wilcoxon signed rank test). There was a relationship between both the Course Experience Questionnaire -23 Appropriate

Workload perception scores and both strategies of the Study Process Questionnaire (Pearson's r=0.3 for surface strategy and r=0.4 for deep strategy).

DISCUSSION AND CONCLUSION

In a sample of students enrolled in learning occupational medicine topics, it has been performed an assessment approach of perceived workload using the Course Experience Questionnaire -23 (Ramsden, 1991) as well as an approach to know the learning strategies they used with the Study Process Questionnaire (Biggs et al., 2001). The assessment of students' perception of their teaching has been performed for a long time ago. Different questionnaires have been used in academic settings, but it was during the last decades when an increasing interest in teaching quality has been developed with the build-up of different assessment tools, including standardized questionnaires. If a limited sample is used, as it is the present case, it is required the use of research instruments scientifically validated. These instruments need to fulfill requirements concerning the reliability and validity in order to be used with confidence and be adapted to different local settings. This is the case when pilot or prospective studies are performed, or when some trends are to be discerned, as is the present case. For the present study, the choosing of both questionnaires, the Course Experience Questionnaire -23 and the Study Process Questionnaire has been justified as both have been assessed concerning their psychometric characteristics, including reliability and validity as it has been demonstrated in studies performed during the last years by different research teams. Concerning the Study Process Questionnaire there are versions in different languages, including in Spanish (Biggs et al., 2001; Cumplido-Hernández, Campos-Arciniega, Chávez-López, & Pérez-García, 2006; Munshi et al., 2012; Stes et al., 2013; Merino & Kumar, 2013; Mogre & Amalba, 2014). In the case of the Course Experience Questionnaire, reliability and validity have also been tested (Broomfield & Bligh, 1998; Byrne & Flood, 2003; Chaleta, Gracio, Sampaio, Leal, & Silva, 2012; Fryer, Ginns, Walker, & Nakao, 2012; González, Carlos et al., 2012; Jansen et al., 2013; Ramsden, 1991; Richardson, 1994; Wilson et al., 1997).

In the present study reliability and validity have been explored on a convenience sample as it is known that when a questionnaire is translated to another language, the concepts may substantially change. It has been selected the original Course Experience Questionnaire -23 version to compare with previous studies. Other Course Experience Questionnaire versions have departed from other amounts of items, modifying the instrument working with a selected group of items, splitting domains, or including the assessment in a longer questionnaire (Harris & Kloubec, 2014; Fryer et al., 2012; Richardson, Marschark, Sarchet, & Sapere, 2010). During the last years, some developments have included distance learning and the use of technologies (Richardson & Price, 2003). The strength of the Course Experience Questionnaire -23 version, as well as

that of the Study Process Questionnaire is founded in that they are validated, and broadly used. It is hoped that the present study may be a departure point to consider its adequacy in the health sciences in the Spanish context.

In line with previous studies the Course Experience Questionnaire -23 version can be considered reliable and valid, although the results are just exploratory and should be taken with caution. But other reports have also considered small samples (Richardson, 1994; Richardson, Gamborg, & Hammerberg, 2005; Ní Chróinín et al., 2012). However this, the response rate in the present study has been high probably facilitated by the anonymization of data. In this way, these results are an initial exploratory departing point to assess the teaching in occupational medicine modules in the specific context where the academic experience is performed.

In the present study, the results have shown that students use more a deeper approach than a surface approach, and there has been a higher relationship between the appropriate workload domain and the use of deep strategies, mainly for contents that require high thinking related to understanding. The results should help to develop new teaching strategies. Some students have shown surface strategies in these modules -that are practical and require comprehension- and this result drives to modify teaching procedures to shift these students to use deep strategies. It is known that modules that are to be applied are highly related to reverse teaching or shared teaching (Betihavas, Bridgman, Kornhaber, & Cross, 2016; Burgess, Roberts, van Diggele, & Mellis, 2017; Gillispie, 2016). All these teaching modifications have to be applied to innovate and improve teaching quality. Accordingly, the modification of pedagogic approaches concerning topics and learning modules follows students learning profiles and perceived workload. This is of special interest nowadays that a high use of new technologies is performed (Clunie, Morris, Joynes, & Pickering, 2017; Tang et al., 2018; Vaona et al., 2018). In addition, knowing the strategies used by students could help to shift those students that mainly use surface approaches to deep approaches in those areas that require a high workload.

Following the results of the present study, it is considered that the initial assessment of students' perceptions should help to understand the strategies used according to the kind of teaching performed. If some teaching modifications are done afterwards they may help successive groups of students. With the resulting teaching modifications, it should be possible to compare groups (consecutive terms), or either compare the strategies of the same group when two different teaching modules are delivered with the modifications performed between both.

Acknowledgements

This work has been done in part under the Projects: ESPY-112/18 (Instituto de Salud Carlos III) and Innova-Teaching in Health Sciences-63 (UCM).

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Received: 16th April 2019
Reception modifications: 30th April 2019
Accepted: 3rd May 2019