Development and validation of two questionnaires for the evaluation of Physiotherapy student satisfaction with university resources and activities

Desarrollo y validación de dos cuestionarios para la evaluación de la satisfacción del estudiante de Fisioterapia con los recursos y actividades universitarias

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Received: 24 june 2021
Accepted: 26 july 2021

ABSTRACT

Introduction: student satisfaction with university teaching is a key indicator for quality improvement. However, validated instruments for student satisfaction assessment for Health Sciences teaching are scarce in Spain. Our aims were to determine reliability and validity of two questionnaires designed to assess physiotherapy student satisfaction with teaching resources and activities and to evaluate student satisfaction. *Material and method:* Physiotherapy students answered the 12-item questionnaires designed in two rounds. Internal consistency was calculated with Cronbach's alpha, test-retest reliability using intraclass correlation coefficient and both known groups and content validity with mean differences and ceiling/floor effects, respectively. Summary statistics were used for student satisfaction. *Results:* in first round, 87 students answered. In second round, 65 and 71 students answered questionnaires on resources and activities, respectively. Both questionnaires showed good internal consistency and good-to-excellent test-retest reliability. Significant differences were found to evaluate validity between groups for activity questionnaire. No floor or ceiling effects were found. An excellent student satisfaction was obtained, being video resources and workshop activity the best scored. *Conclusions:* these questionnaires can be satisfactory tools to be implemented to improve university teaching quality in Health Sciences. There is an excellent student satisfaction with resources and activities closely related to clinical practice. Combination of virtual and face-to-face resources or activities could be associated with an improvement in student satisfaction. This study is a first step in determining reliable and valid instruments to assess quality of Physiotherapy university teaching and to set up a starting point for studies that seek student perception assessment.

Keywords: personal satisfaction, Physical therapy specialty, reproducibility of results, teaching, universities.

RESUMEN

Introducción: *la satisfacción de los estudiantes con la docencia universitaria es un indicador clave para mejorar la calidad, pero los instrumentos validados en España en Ciencias de la Salud son escasos. Nuestros objetivos fueron determinar la fiabilidad y validez de dos cuestionarios diseñados para evaluar la satisfacción de los estudiantes de fisioterapia con recursos y actividades y evaluar con ellos la satisfacción de los estudiantes*. Material y método: *los estudiantes respondieron a los cuestionarios de 12 ítems diseñados en dos rondas. La consistencia interna se calculó con el alfa de Cronbach, la fiabilidad test-retest utilizando el coeficiente de correlación intraclase y grupos conocidos y la validez de contenido con diferencias de medias y efectos techo/suelo. Se analizó también la satisfacción de los estudiantes. Resultados: en la primera ronda respondieron 87 estudiantes y en la segunda, 65 y 71 estudiantes respondieron el cuestionario sobre recursos y actividades, respectivamente. Ambos cuestionarios mostraron buena consistencia interna y fiabilidad test-retest de buena a excelente. Se encontraron diferencias significativas en la validez entre grupos del cuestionario de actividades. No se encontraron efectos de suelo o techo. Se obtuvo una excelente satisfacción de los estudiantes, destacando los vídeos y taller práctico. Conclusiones: estos cuestionarios pueden resultar útiles en Ciencias de la Salud, pues resultan fiables y válidos para evaluar la calidad de la docencia universitaria de Fisioterapia. Existe una excelente satisfacción de los estudiantes con recursos y actividades estrechamente relacionados con la práctica clínica y la combinación de las modalidades virtual y presencial parece resultar beneficiosa.*

Palabras clave: *satisfacción personal, especialidad de Fisioterapia, reproducibilidad de resultados, docencia, universidades.*

Los datos generados y/o analizados en el presente estudio están disponibles en el siguiente link:
https://fubmanmy.sharepoint.com/:f:/g/personal/lsalles_umanresa_cat/EqdTSN1oUudNk8LSJbTX13IBG1OHnuHiNw0iBonlXB0gOw?e=qcC29u.

INTRODUCTION

The implementation of the European Higher Education Area brought about a new design of university study programmes to emphasize the acquisition of competences by student, who needs to acquire a greater role in their learning process[1]. Planning of teaching-learning activities should facilitate autonomous learning based on specific didactic resources, which arouse students' interest[2], or create more motivating environments and promote self-learning processes[3].

In health-care education, teaching and learning methods are a continuing source of challenge for teachers due to recent advances in their field of knowledge and demands of the community[4], these methods focus on the acquisition of scientific knowledge and specialized technical skills[4]. Besides, practice-based learning is relevant in student health professionals to be prepared to their future workplaces[5], allowing self-assessment that promotes self-learning.

Institutions must vouch for quality of their educational processes and make results public, through evaluation strategies that facilitate the implementation of continuous improvement measures[6]. University quality is evaluated through university rankings[7] and annual satisfaction surveys are carried out for students, teachers, administration and service staff. Besides, most universities have a specific programme for teacher's evaluation that assesses characteristics of subjects and activities of teaching staff[8]. Despite being the most used system, it is not exempt from criticism because it is based on student satisfaction. Likewise, when evaluating teacher, student satisfaction with evaluations methods and assessments has been examined[9] but other key aspects of teaching activity can be underestimated, such as creation of relevant didactic resources and carrying out of teaching-learning activities

which favour autonomous student learning and lead to the acquisition of professional competences[2]. Therefore, it is necessary to highlight the importance of evaluations in terms of teaching resources and activities to provide high-level teaching.

Whereas student satisfaction with resources based on information and communication technologies has been widely evaluated, satisfaction with resources developed specifically by teachers has been rarely studied[10]. In Spain, only one study[11] designed and validated a specific instrument to evaluate satisfaction of Physiotherapy students with teaching resources (presentations, scientific publications, manual, contents), showing good internal consistency, a ceiling effect and PowerPoint presentations as the best valued resource[11]. In Health Sciences university studies, the high number of practical elements and interpersonal nature of professional interventions require fostering of activities which favour autonomous, active and experience-based learning and generation of very specific didactic resources[12]. Problem-based learning, collaborative learning and resolution of clinical cases[13] are frequently used. In order to encourage the acquisition of specific competences, resources and teaching activities have to be optimised[11] and documentary and audio-visual material about real patients is useful to encourage meaningful learning in clinical setting[13]. In Physiotherapy, the evaluation of quality of these resources and activities would seem to be pertinent. Therefore, the aims of this study were:

– To determine reliability and validity of two questionnaires designed to assess student satisfaction with teaching resources and teaching-learning activities in Physiotherapy.
– To evaluate student satisfaction.

MATERIAL AND METHOD

A prospective study was carried out in the 2015-17 academic period, in which students of a subject with theoretical and practical content of the 3rd year of the Degree in Physiotherapy participated. The project was previously approved by the Institutional Research Commission and followed the ethical principles of the Declaration of Helsinki[14]. All students who voluntarily participated provided their informed consent and confidentiality of their personal data was guaranteed in accordance with current legislation. All data were protected.

Prior to undertaking this study, we did not find any scales or questionnaires validated in Spain in the field of university teaching in Physiotherapy which assessed satisfaction with teaching materials or teaching-learning activities. Therefore, we decided to concentrate on the design of two specific questionnaires in the first place, before proceeding with their validation. We based our design on a questionnaire devised in Mexico[13] to assess satisfaction of students and teachers of Medicine with discussion of clinical cases. Based partly on this instrument, two questionnaires were developed to determine the degree of physiotherapy student satisfaction with didactic resources used (audio-visual and documentaries) in a particular subject, as well as with teaching-learning activities, both face-to-face and virtual ones.

The questionnaires were developed over 2015-2016 academic year. For its creation, a committee of experts was formed to decide on the most adequate items of each one of the two questionnaires. Different aspects concerning resources and activities to be evaluated were taken into consideration such as their duration, extension or quantity, as well as facilitating factors to help students' comprehension such as clarity of statements, interest of the topic, etc. Besides, in the didactic resource questionnaire items were distributed in relation to the type of resources used: audio-visual resources such as podcasts or videos about assessment or treatment of real patients; and documentary resources such as PowerPoint presentations, scientific publications and blogs about the question in hand. In the activity questionnaire, items were organised by differentiating face-to-face activities carried out in classroom, such as practical workshops where exercises are carried out among students themselves, and virtual ones with test-type questionnaires, word searches, etc., made through the Moodle platform.

Each questionnaire (table 1) consisted of 12 items to be answered by students (6 items for each type: audio-visual and documentary in the resource questionnaire, face-to-face and virtual in the activities questionnaire) using a Likert scale of 5 points: 1 (Strongly disagree); 2 (Disagree); 3 (Neither agree nor disagree); 4 (Agree); 5 (Strongly agree).

TABLE 1. **Items to be evaluated in each questionnaire.**

Item	Didactic resources questionnaire	Activities questionnaire
1	The scientific articles and texts have been a useful addition to the subject	The face-to-face test questionnaire fosters the study of contents
2	The audio-visual resources have made it easier to learn the key concepts of the subject	The face-to-face activities have been profitable
3	The length of the podcasts has been adequate	The number of virtual activities has been adequate
4	The contents of the documents supplied have been attractive	The explanations of the virtual activities have been clear and understandable
5	The length of the videos has been adequate	The face-to-face integration test has fostered better understanding
6	The audio-visual resources used are of a good technical quality	The time required for virtual activities has been optimal
7	The PowerPoint presentations have made studying the subject easier	Practical workshops have allowed a better understanding of the patient
8	The audio-visual resources have allowed a better understanding of the patient	Virtual activities have helped you to complement the knowledge acquired in class
9	The PowerPoint presentations have presented the topics to be studied in a clear and concise manner	The distribution over time of virtual activities has been beneficial
10	The number of documents supplied has been adequate	The number of practical activities in class has been sufficient
11	The topics covered in the videos have been interesting for you	The face-to-face tasks have been agile and dynamic
12	The documents used have had an adequate length	The virtual activities have been interesting

Didactic resources

A wide range of audio-visual and documentary resources as well as learning activities related to these resources, similarly to previous studies[15-18], were planned and elaborated during the 2015-16 academic year. The list of resources and virtual activities linked with them is presented in table 2.

Regarding the multimedia resources, a podcast with specific contents was elaborated. Moreover, some real patients were asked to attend to the university facilities to take part of some videos. These videos, following their edition, pretended to show the clinical reasoning that a physiotherapist should follow when assisting each type of patients, from the first evaluation until the treatment period and, at the same time, to facilitate comparison of different characteristics between patients and pathological conditions. Multimedia resources were chosen as video or multimedia-based learning resources can promote deeper learning and assist students to become self-sufficient and capable self-learners, allowing for the possibility of asynchronous education[17]. Videos were designed to promote mobilisation of knowledge and its application in problem-solving and real-life situations[3]. In fact, a total of 21 videos were generated but two of these videos were used as the basis for two virtual activities

TABLE 2. **Resources and virtual activities directly related.**

	Resources	Virtual related activities
Audio-visual resources	Podcast: Action elements	Patient's action elements
	Video: Patient's pathological action analysis	Patient's pathological action analysis
	Video: From the action to the therapeutic exercise	From the action to the therapeutic exercise
Documentary resources	Scientific article: Review 1	Review 1 Test
	Scientific article: Review 2	Two first-sessions Test
	Topic reading: Motor patient's deficits	Motor patient's deficits
	Scientific article: Clinical trial	Forum for debate
	Scientific article: Clinical trial	Forum for debate

while the other videos were shown and discussed at classroom, during three of the face-to-face lessons, to promote student self-learning process from guide of teacher and dialogue between students[3].

Documentary resources consist of specific readings, scientific articles and PowerPoint presentation used by teacher in classroom sessions. All of them were available at the space of the subject at the Moodle platform. Students were asked to use these resources during some virtual activities, as shown in table 2 or in activities performed during face-to-face sessions.

Regarding the activities, some of them were planned as virtual ones to be performed between face-to-face lessons, while others were thought to be performed at classroom, as they were designed to develop more practical competences by students, an essential aspect in the Degree in Physiotherapy. Seven virtual activities were planned to be performed individually by every student, consisting in some tests compounded by multiple-choice or true/false questions, a forum and a word search activity, all of them related to one or some of didactic resources (table 2). In face-to-face classroom sessions a test with multiple choice questions, oral or written interpretation and discussion of different clinical cases through patients' videos were carried out to integrate concepts. Furthermore, practical workshops by three-student groups provided simulation experiences to students, who alternate the role of physiotherapist, patient or observer in cases proposed by teacher. Virtual activities were specifically designed for being carried out and evaluated via Moodle, which is the university virtual platform. Electronic submissions were selected to enable teachers to decentralise process of reviewing student performance and providing feedback. The planification of face-to-face and virtual activities was designed to promote self-learning, through interaction between traditional teaching approaches and e-learning[17].

All virtual and face-to-face activities were implemented during the 10-weekly-sessions period in the 2016-17 academic year. Each session was usually performed one par week in 3 groups of 24-25 students per group in the morning shift and 3 groups of 27-28 students per group in the afternoon shift. There were 3 teachers who developed the lessons in both shifts but each teacher was responsible for a group.

Evaluation of the questionnaires and student satisfaction

At the end of the 10-weeks course the two satisfaction questionnaires about resources and activities were ad-

ministrated to obtain specific information about student satisfaction on all resources and activities (virtual and face-to-face ones) used during the subject. The questionnaires were filled in by students by means of an online form in two rounds of responses 1 week apart, period of time considered sufficient in order to avoid the memory factor, and with a margin of 3 days to answer. Whereas both rounds were analysed to validate the questionnaires, only the first round was considered for the evaluation of student satisfaction. In all questionnaires, each student indicated only his number list and his or her study shift (morning/afternoon). Immediately after verification of correction of the complete process, a blind researcher substituted number list by a code to ensure anonymity of students.

Statistical analysis

All data was managed and analysed with STATA 15 (StataCorp 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC). For the descriptive analysis, summary statistics were used: mean, standard deviation, minimum and maximum values, median and 25 and 75 percentiles for the continuous variables and frequencies and percentages for the categorical variables.

For internal consistency, Cronbach's alpha was used for items and total of the scale in function of the average covariance between all possible combinations of the variables and unilateral confidence intervals (CI) were calculated[19]. Coefficient values between 0.7 and less than 0.9 can be considered as good whereas values 0.9 are excellent.

To verify the test-retest reliability, item scores were added together to obtain a total value and the intraclass correlation coefficient (ICC) was used for absolute agreement and 95% CI, ICC (2.1) calculated from a model of variance analysis with rounds and individuals as a random effect[19]. Coefficient values between 0.7 and 0.9 can be considered as good and values> 0.9 are excellent. Assumptions regarding the model residuals were verified by inspecting the model residuals histograms. Concordance was evaluated using the minimum detectable change (MDC) defined as $1.96*\sqrt{2}*SEM = 2.77*SEM$, where SEM is the standard error of measurement. This number was calculated as $SD\sqrt{}[1 - ICC (2,1)]$, where SD is the standard deviation of the total score calculated with individuals with a scale value in the two rounds. Temporal stability was verified visually by the Blant-Altman graphic method and by graphs of the individual variation vs. the average value of rounds. If no trend appears, it means that there is temporary stability.

For the validity of known groups, the average value of the instrument was compared between the morning and afternoon classes by means of CI for the mean difference[20]. For content validity, the floor and ceiling effects were analysed descriptively for the total scores of each scale, describing number of individuals that gave the worst or best result through the 10th and 90th percentiles respectively. The limit used to consider existence of such effects was 15 %.

Respect to student satisfaction, summary statistics as mean, standard deviation, median and free distribution CI for medians and their difference have been applied.

RESULTS

A total of 157 students were asked to voluntarily respond in two rounds; 87 students (55.4 %) answered the resource questionnaire in the first round (R1) and 65 students (41.4 %) in the second round (R2). The activity questionnaire was answered by 87 students (55.4 %) in R1 and 71 (45.2 %) in R2. The study population consisted of 49 % females and 51 % males. The mean age was 22.7 years with a standard deviation of 4.8 years.

Regarding the internal consistency of the resource questionnaire, the coefficient is 0.88 with a lower limit of the unilateral 95 % CI for Cronbach's alpha (α) of 0.85, suggesting that confidence that the coefficient is greater than this value is 95 %. With respect to the activities questionnaire, the value of α is 0.89 with a lower limit of the interval of 0.86. Both questionnaires showed good internal consistency.

In terms of test-retest reliability, the assumptions of the variance analysis model were verified. In figure 1 histograms of the residuals for the two questionnaires can be seen showing approximately normal distribution. The ICC for the resource questionnaire is 0.87 with a CI between 0.8 and 0.92, suggesting that test-retest re-

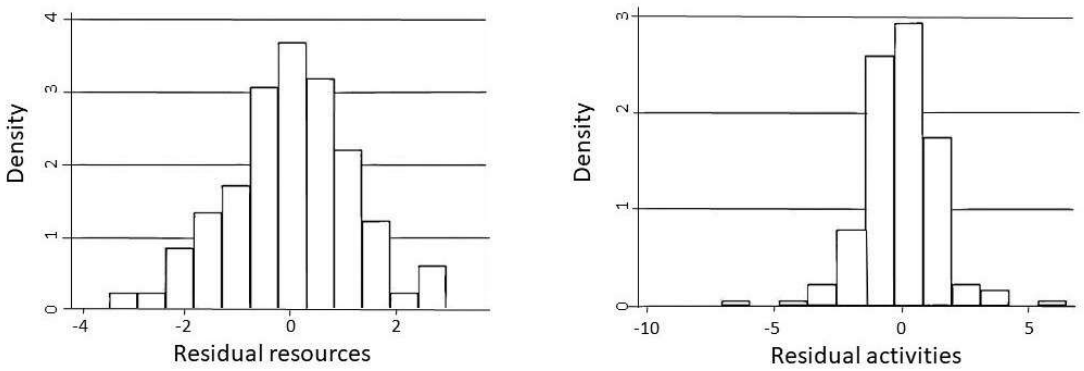

FIGURA 1. **Normality of residuals.**

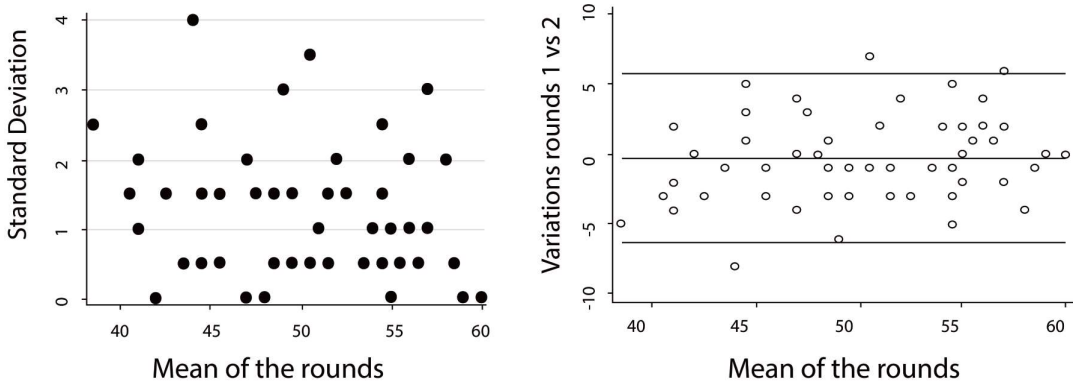

FIGURA 2. **Temporary stability of the resource questionnaire. The three horizontal lines in the figure on the right indicate the observed average and the values of the limits of concordance**.

liability can be considered between good and excellent. In the activity questionnaire, the ICC is 0.82 with a CI between 0.72 and 0.89, demonstrating good test-retest reliability.

With respect to concordance, in the resource questionnaire, SEM was 2.1, a value which is much lower than the standard deviation of the total score (5.9). Thus, in this sample, the ICC and SEM values suggest high reliability and accuracy. The MDC value was 5.84 and 93 % of individuals reported a difference value between rounds which was lower than this figure, which indicates excellent concordance. In the activity questionnaire, the SEM was 2.5, a value much lower than the standard deviation of the total score (5.9). The ICC and SEM values also indicate high reliability and accuracy. The MDC value was 6.9 and 94 % of individuals reported a difference value between rounds which was lower than this figure, which also shows excellent concordance.

Regarding the temporal stability of the resource questionnaire, figure 2 shows on the left graph of individual variations vs. mean of rounds, with temporary stability being noted when no trend of data is observed. To the right of the figure, the Bland-Altman graph can be seen, where the closeness between lines corresponding to the observed average and the zero value can be appreciated. Except for two values, the rest of values lie within the limits of concordance. There is no systematic error because values of the differences do not vary when magnitude of the score increases.

Figure 3 analyses the activity questionnaire and on the left, temporary stability is also observed when no data trend is observed. The Bland-Altman graph is presented

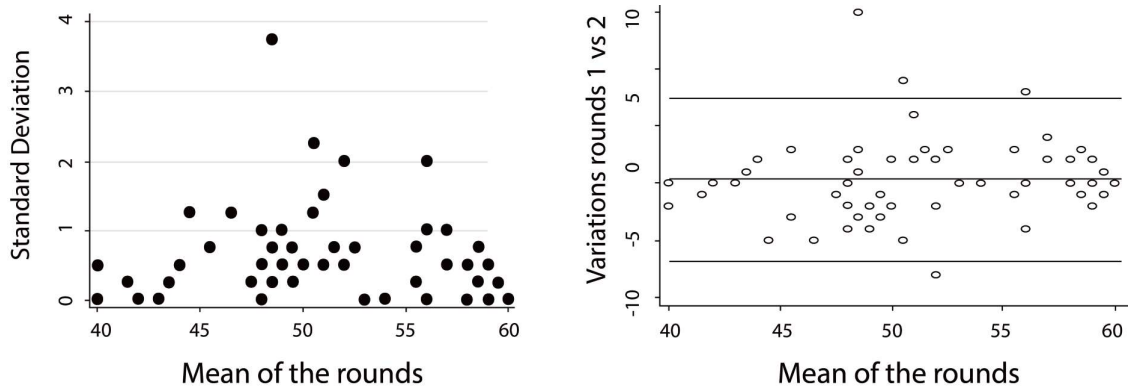

FIGURA 3. **Temporary stability of the activity questionnaire. The three horizontal lines in the figure on the right indicate the observed average and the values of the limits of concordance.**

to the right of figure, where systematic error is not observed either, since values of the differences do not vary either when magnitude of the score increases

Regarding validity, scores obtained in the resource questionnaire, expressed by their average value (95% CI), were 48.9 (46.7, 51.1) for the group of students in the morning and 51.2 (49.7, 52.9) for the group in the afternoon. In the activity questionnaire scores were 49.0 (47.4, 50.7) for the morning group and 51.5 (50.2, 52.8) for the afternoon group. No significant differences were found between scores of the morning group of students and those of the afternoon group for the resource questionnaire, with a difference of -2.34 (P = 0.0777, 95 % CI: -4.96, 0.265). However, the activity questionnaire showed a difference in scores of -2.44 (P = 0.0195, 95 % CI: -4.49, -0.39).

In content validity, no floor or ceiling effect was found in either of the two questionnaires since proportion of students below the 10th percentile or above the 90th percentile was acceptable (<15 %). Specifically, students who awarded a score of <42 in the resource questionnaire were 11 (12.6 %) and those who gave a score of <41 in the activity questionnaire were 9 (10.3 %). Regarding the ceiling effect, only 9 students (10.3 %) gave a score of > 59 in the resource questionnaire whereas 7 students (8 %) gave a score of > 58 in the activities one.

Regarding student satisfaction, the median total score confidence limits from 49 to 52 was obtained for all resources and all activities, demonstrating an excellent student satisfaction. The total score ranges from 0 to 60 (12 items, each item with a maximum score of 5).

In student satisfaction questionnaire on resources, 9 out of 12 items scored 4, with exception of items 2, 8 and 11 (table 1) scored with a 5 value. All those three items are related on the use of video resources as a mean for carrying on the face-to-face lessons and promoting a better understanding and learning of the subject for clinical practice. The rest of items, which regard more the podcast (audio-resource) and mainly the documentary resources, were also well-considered (score of 4).

Regarding student satisfaction questionnaire on activities, 11 out of 12 items were scored as 4. The item number 7 was the best scored with a 5. This item refers to the workshop activity in which physical therapist students should practice among them exercises proposed through a clinical case. This activity pretends to integrate theoretical knowledge into a more realistic situation very useful for clinical practice. The 11 items are related to both other face-to-face and virtual activities carried on during the course as well as to their methodological aspects for the implementation such as amount, length or timeline distribution of activities.

DISCUSSION

Several studies have shown the importance of assessing satisfaction with university teaching, because of its great relevance in the performance of students and well-being of the entire university community[21]. The im-

plementation of quality systems focused on the measurement of student satisfaction with teaching received allows opinion of one of the agents in teaching-learning process to be known. However, it can lead to confusion between the measurement of quality and satisfaction and, in the case of using psychometrically inappropriate instruments, it can even result in erroneous conclusions[22]. Considering that the evaluation of student satisfaction is one of the factors that determine quality of university education[21], it is necessary to have specific instruments that can assess satisfaction not only with the teachers themselves[3], but also with resources and teaching activities regarding the professional skills that are intended to be acquired. This evaluation seems necessary because teaching materials have proved to be useful for students, evaluated through scales without prior validation[3, 23]. Because at the beginning of this study no validated tool had been found in Spain, we based our present work on a questionnaire designed and validated in Mexico whose objective was to evaluate the satisfaction of students and teachers of Medicine with discussion of clinical cases[13]. Máynez-Contreras questionnaire[13] was referred to one specific methodological issue, the clinical cases, which can be considered, at the same time, as a resource and as a teaching-learning activity. On the other hand, we designed 2 questionnaires in order to differentiate the assessment of resources and activities as well as to include not only the clinical cases but other types of resources such as podcast and video, or activities such as workshops and test questionnaires.

After the beginning of the current project, a study was published in Spain with a specific questionnaire to assess didactic resources used in Physiotherapy teaching, which showed good internal consistency and a ceiling effect[11, 23]. The questionnaire validated in the present work includes a greater number and diversity of resources and is complemented with the satisfaction questionnaire for assessing teaching activities related to these resources. This aspect was not considered in the aforementioned study, although the authors acknowledged that didactic resources can affect the usefulness, effectiveness and satisfaction that their use generates depending on teaching-learning activities in which they are utilised[23]. The methodological design of university teaching should be based on these considerations, since both the material and the activities can also have a negative effect on the acquisition of skills by student[24]. To optimise these processes, the questionnaires developed in the present work allow evaluating both the satisfaction with teaching resources and teaching activities. They can equally be applied to any subject within the field of Health Sciences.

The satisfaction assessment questionnaire with teaching resources and the activity questionnaire have obtained high reliability values (internal consistency, test-retest reliability and temporal stability) and content validity, as they have not shown any floor or ceiling effect, unlike a questionnaire for the evaluation of teaching materials[11] which showed a ceiling effect. Regarding the validity of known groups, although no statistically significant differences were observed between scores of the morning group of students and those of the afternoon group for the resource questionnaire, these were found in the activity questionnaire. These differences could be explained by a greater subjectivity in the evaluation of teaching activities due to disparities between student first-hand experiences[4]. Other authors have reflected differences in the use of some of the resources studied among students of different Physiotherapy courses[23], but they did not evaluate different groups of the same course or activities, so these results cannot be compared. Class attitude could be influenced these results as it has demonstrated effects on student academic achievement, college and curriculum satisfaction(21). Academic achievement has not been studied in the present study and its relationship with student satisfaction should be studied in future studies.

On the other hand, our data showed excellent student satisfaction in both questionnaires. In the didactic resource questionnaire, all items were scored on a Likert scale ranging from 4 to 5, showing high median scores in each item. Audio-visual resources showed a higher score, being video resources the highest score as an important mean for carrying on the face-to-face lessons and promoting a better understanding and learning of the subject for clinical practice[5]. Therefore, video resources provide excellent assessments of their contents and promote student interest, supplying a better understanding and learning of reasoning in clinical practice. According to our

results, previous studies[17, 18, 25] also showed high levels of student satisfaction in video-based learning activity related to improvement in student confidence in the practical examination and promotion of effective learning associated with improvement in content understanding and clinical problem-solving in student health professionals[18].

In the activity questionnaire, all items were scored on a Likert scale ranging from 4 to 5, showing high median scores in each item. However, workshop was considered the best scored with a 5. This activity allows integrating the theoretical knowledge into a more realistic situation very useful for clinical practice, the key point for the development of clinical competence in Physiotherapy[26]. According to our results, a previous study[27] also showed high levels of student satisfaction in workshop activity related to improvements in student motivation and preparedness for clinical experience.

Therefore, this paper provides preliminary evidence that combination of virtual and face-to-face resources or activities could be associated with an improvement in student satisfaction. These findings suggest that implementation of blended learning could be superior to the traditional teaching in Physiotherapy education[28], showing the importance of development of these resources or activities and tools for their assessment in the context of Covid-19 pandemic or similar. However, future studies are needed to clarify our results and extrapolate them to other courses of Physiotherapy and other Health Sciences university studies.

Some limitations of the present study would be that non-probabilistic samples used run the risk of leading to biased results, as the most satisfied students or those with a higher degree of dissatisfaction may have responded, but the results do not seem to indicate the existence of this bias. Besides, results of the analysis of students' answers to a survey were collected by means of an online form, which avoided the selection bias of students who came to class at a given moment of the subject[23] and possible pressure to which they could be subjected to respond in the presence of teacher. Although three teachers could lead to differences in student assessment among groups due to their teaching methodologies, the use of similar teaching methodology and the same activities and resources reduced the likelihood of important differences. Lastly, the sample used is slightly lower than that in other studies on the perception and satisfaction of university students[29, 30] and extrapolating these results to other subjects and universities must be done with caution. However, this work offers two reliable and valid instruments whose use can serve as a starting point for studies that seek to know student perception of resources and activities used in university teaching. According to our knowledge, they are the first validated ones in Spain for these issues in Physiotherapy. Considering that currently quality of university education is a primordial objective[31], this work is considered of great interest to offer an instrument to foster the collection of this information in Health Sciences university studies.

CONCLUSION

The questionnaires developed are a valid and reliable instrument to assess student satisfaction with teaching resources and teaching-learning activities in Physiotherapy. Besides, they showed high level of student satisfaction related to a wide range of didactic resources and activities selected. These questionnaires can be an inexpensive and easy-to-apply tool for the evaluation of university teaching in Physiotherapy.

ETHICAL RESPONSIBILITIES

Protection of people and animals. The project followed the ethical principles of the Declaration of Helsinki.

Confidentiality and informed consent. The project was previously approved by the Institutional Research Commission. All students who voluntarily participated provided their informed consent and confidentiality of their personal data was guaranteed in accordance with current legislation. All data were protected.

Declaration of Interest statement. None.

Funding. This work was supported by grants from the Bages University Foundation within the framework of the Neurocognitive Project on Teaching Innovation

Authorship contributions. PMC, LSO: Conceptualization, Methodology, Software. MRL, AMM: Data curation. PMC, LSO: Visualization, Investigation. LSO: Supervision. MRL: Software, Validation. All authors: Writing- Original draft preparation. Writing- Reviewing and Editing.

ACKNOWLEDGMENTS

We would like to express our gratitude to Jordi Romero and Roberta Ghedina for their collaboration in the application of teaching resources and activities as well as to Jorge Ruiz for the statistical analysis.

REFERENCES

1. Lobato RD, Lagares A, Alén JF, Alday R. El desarrollo del proceso de "Bolonia" y el Grado de Medicina. Situación actual y expectativas para su implantación definitiva. Neurocirugia (Astur). 2010; 21(2):146–56.
2. Álvarez F, Rodríguez-Perez JR, Sanz-Ablanedo E, Fernández-Martínez M. Aprender enseñando: elaboración de materiales didácticos que facilitan el aprendizaje autónomo. Form Univ. 2008; 1(6): 19–28.
3. Lemos MS, Queirós C, Teixeira PM, Menezes I. Development and validation of a theoretically based, multidimensional questionnaire of student evaluation of university teaching. Assess Eval High Educ. 2011; 36(7): 843–64.
4. Qutishat D, Muhaidat J, Mohammad M, Okasheh R, Al-Khlaifat L, Al-Yahya E. Exploring attitudes of physiotherapy students towards a community-based project used as a learning tool. Physiother Theory Pract. 2021; 37(1): 115–25.
5. Clouder L, Toms J. Impact of oral assessment on physiotherapy students' learning in practice. Physiother Theory Pract. 2008; 24(1): 29–42.
6. Llarena MG, Villodre SL, Pontoriero FA, Cattapan AB. Modelo de sistema de gestión de calidad para la puesta en marcha de cursos no presenciales: instrumentos de seguimiento y evaluación. Form Univ. 2014; 7(6): 3–16.
7. Ordorika I. Rankings universitarios. Rev Educ Sup. 2015; 44(173): 7–9.
8. Agencia Nacional de Evaluación de la Calidad y Acreditación [Internet]. Madrid: ANECA; c2014 - [cited 2021 Jun 23]. Documentación del programa; [about 4 screens]. Available from: http://www.aneca.es/Programas-de-evaluacion/Evaluacion-institucional/DOCENTIA/Documentacion-del-programa
9. He L, Yang N, Xu L, Ping F, Li W, Sun Q, et al. Synchronous distance education vs traditional education for health science students: a systematic review and meta-analysis. Med Educ. 2021; 55(3): 293–308.
10. Kozub R. Student attitude towards and use of Powerpoint slides as study guides in undergraduate introductory financial accounting. J Coll Teach Learn. 2010; 7(3): 39–48.
11. Sánchez-Sánchez ML, Espí-Lopez GV, Ruescas-Nicolau MA. Satisfacción de los estudiantes pregrado de Fisioterapia con el material docente facilitado por el profesorado. Cuest Fisioter. 2016; 45(1) :3–18.
12. Tilson JK, Mickan S. Promoting physical therapists' of research evidence to inform clinical practice: part 1--theoretical foundation, evidence, and description of the PEAK program. BMC Med Educ. 2014; 14: 1–8.
13. Máynez-Contreras AMG, Reynaga-Obregón J, Márquez-Algara L. Satisfacción con la discusión de casos clínicos como herramienta didáctica: informe de dos ciclos escolares. Inv Ed Med. 2014; 3(9): 3–8.
14. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. JAMA. 2013; 310(20): 2191–4.
15. Clark K, Whalen Smith CN, Kohls L, Musabyemariya I, Kayonga Ntagungira E, Mann M, et al. A global health training model for teaching pediatric clinical decision making skills to Rwandan physical therapists: A case report. Physiother Theory Pract. 2019; 35(9): 891–903.
16. Mącznik AK, Ribeiro DC, Baxter GD. Online technology use in physiotherapy teaching and learning: a systematic review of effectiveness and users' perceptions. BMC Med Educ. 2015; 15: 1–12.
17. Maloney S, Storr M, Paynter S, Morgan P, Ilic D. Investigating the efficacy of practical skill teaching: a pilot-study comparing three educational methods. Adv Health Sci Educ Theory Pract. 2013; 18(1): 71–80.
18. Weeks BK, Horan SA. A video-based learning activity is effective for preparing physiotherapy students for practical examinations. Physiotherapy. 2013; 99(4): 292–7.
19. Gwet KL. Handbook of inter-rater reliability. 4th ed. Gaithersburg: Advanced Analytics LLC; 2014.
20. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol

DL, Dekker J, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol. 2007; 60(1): 34–42.

21. Kim YL, Lee SM. Effect of satisfaction in major at university on academic achievement among physical therapy students. J Phys Ther Sci. 2015; 27(2): 405-9.
22. González-Arias MI, Carabantes-Olivares E, Muñoz-Carreño NE. Construcción y validación de la Escala de Apreciación de la Calidad del Programa de Asignatura: propuesta para el estudio de la calidad de la docencia. Form Univ. 2016; 9(1): 77-90.
23. Ruescas-Nicolau MA, Sánchez-Sánchez ML, Espí-López GV. Valoración y criterios de uso del material docente por parte de los estudiantes de Fisioterapia. Fisioterapia. 2015; 37(6): 262–70.
24. Domínguez-Pérez DA, Pérez-Rull MN. El PowerPoint una estrategia de aprendizaje o un tecno-hábito en el nivel superior. In: Instituto Politécnico Nacional CFIE, editors. VI Foro de Investigación Educativa de 2011; 2011 Oct 19; Mexico D.F, Mexico. Mexico D.F.: Repositorio Digital IPN; 2011. p. 214–20.
25. Kiami SR, Donlan P. Usability and efficacy of neurologic digital case studies to promote clinical decision-making skills among physical therapist students. J Allied Health. 2019 Spring; 48(1): 31–7.
26. Lo K, Osadnik CR, Leonard M, Maloney SR. Student-clinician agreement in clinical competence as a predictor of clinical placement performance in Australian undergraduate physiotherapy students. Physiother Theory Pract. 2016; 32(1): 63–8.
27. Phillips AC, Mackintosh SF, Bell A, Johnston KN. Developing physiotherapy student safety skills in readiness for clinical placement using standardised patients compared with peer-role play: a pilot non-randomised controlled trial. BMC Med Educ. 2017; 17(1): 1–10.
28. Ødegaard NB, Myrhaug HT, Dahl-Michelsen T, Røe Y. Digital learning designs in physiotherapy education: a systematic review and meta-analysis. BMC Med Educ. 2021; 21(1): 1–18.
29. Gallego-Izquierdo T, Pecos-Martín D, Chamorro-Moriana G, Rebollo-Salas M, Fernández-Tejeda M. Evaluación de la organización y la planificación de un programa de estancias clínicas de Fisioterapia. Cuest Fisioter. 2013; 42(1): 3–13.
30. Peña-Hernández P, Zapata-Cárdenas D, Cano-Marín P. Percepción de estudiantes de Fisioterapia sobre competencias en investigación y factores determinantes de actividades científicas. Cuest Fisioter. 2014; 43(2): 100–9.
31. Stukalina Y. Identifying predictors of student satisfaction and student motivation in the framework of assuring quality in the delivery of higher education services. GMEE. 2014; 12(1): 127–37.