Artiles-Rodríguez, J., Guerra-Santana, M., Aguiar-Perera, M.ª V., & Mazorra-Aguiar, L. (2024). Evaluation of the use of educational podcasts as a collaborative learning tool taking into consideration participation in its creation. *RELIEVE*, *30*(1), art.1. http://doi.org/10.30827/relieve.v30i1.27474

Revista ELectrónica de Investigación y EValuación Educativa

RELIEVE

e-Journal of Educational Research, Assessment and Evaluation

ISSN: 1134-4032

Evaluation of the use of educational podcasts as a collaborative learning tool taking into consideration participation in its creation

Evaluación del uso del podcast educativo como herramienta de aprendizaje colaborativo teniendo en cuenta la participación en la producción

Avaliação da utilização do podcast educativo como ferramenta de aprendizagem colaborativa tendo em conta a participação na produção

基于参与制作评估教育播客作为协作学习工具的使用

تقييم استخدام البودكاست التعليمي كأداة للتعلم التعاوني مع مراعاة المشاركة في الإنتاج.

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Abstract

This paper analyses the result of applying podcasts as a teaching-learning tool for university students. Using a quantitative methodology, with a descriptive and correlational design, Levene's inferential t-test for equality of variances was used to compare two groups of students to assess if there are differences regarding the academic, design, usability and learning variables, in order to verify the differences between students creating the contents and those only listening to the end result. A sample of 461 students was used in this research, distributed in two groups. In the first group, the teaching staff oversaw preparing and carrying out the dynamics of the podcast. In the second group, the students collaboratively created the podcast. To analyse the differences between the two groups, the Educational Innovation Questionnaire (CINNE) was applied, based on the Podcast Evaluation Questionnaire, QAEP (Alarcón and Blanca, 2020), and the SUS Scale (Brooke, 2013). The results indicate significant differences (99.95% CI 99.95%) between the groups in the usability and design dimensions. No gender differences were found. In conclusion, this research paper has confirmed the effectiveness of using podcasts as a didactic strategy, in particular regarding its accessibility, use, and design by students.

Keywords: podcasts, collaborative learning, usability, university students, assessment, design.

Resumen

Esta investigación es el resultado de la aplicación de los podcasts como herramienta de enseñanza-aprendizaje y diseñados para ser usados por estudiantes universitarios. Mediante una metodología cuantitativa, con diseño descriptivo y correlacional, empleamos la prueba inferencial t de Levene de igualdad de varianzas para comparar dos grupos de estudiantes con el fin de comprobar si existen diferencias en variables de naturaleza académica, de diseño, de usabilidad y de aprendizaje, con el propósito de comprobar las diferencias entre el alumnado que lo elabora y el que solo lo escucha. Contamos con una muestra de 461 estudiantes, distribuidos en dos grupos. Un grupo donde el profesorado es el encargado de elaborar y realizar la dinámica del podcast. En el segundo grupo el alumnado crea colaborativamente el podcast. Para comprobar si existen diferencias entre ambos grupos se aplicó el Cuestionario de Innovación Educativa (CINNE), basado en el Cuestionario de Evaluación de Podcasts, QAEP (Alarcón y Blanca, 2020), y la Escala SUS (Brooke, 2013). Los resultados indican que se dan diferencias significativas (IC 99,95%) entre los grupos en las dimensiones usabilidad y diseño. No se hallaron diferencias por razón del género. En conclusión, este estudio ha validado la eficacia del podcast como una estrategia didáctica, destacando especialmente el acceso, uso y diseño por parte del alumnado.

Palabras clave: podcasts, aprendizaje colaborativo, usabilidad, alumnado universitario, evaluación, diseño.

Received/*Recibido*	Feb 24, 2023	**Approved /*Aprobado***	Apr 19, 2024	**Published/*Publicado***	Jun 20, 2024

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Resumo

Esta investigação é o resultado da aplicação dos podcasts como ferramenta de ensino-aprendizagem e concebidos para ser utilizados por estudantes universitários. Utilizando uma metodologia quantitativa, com um design descritivo e correlacional, recorremos ao teste inferencial t de Levene de igualdade de variâncias para comparar dois grupos de estudantes, de forma a verificar se existem diferenças em variáveis de natureza académica, design, usabilidade e aprendizagem, com o objetivo de verificar as diferenças entre os alunos que o elaboram e os que apenas o ouvem. Tivemos uma amostra de 461 estudantes, distribuídos em dois grupos. Um grupo em que os professores são responsáveis pela elaboração e realização da dinâmica do podcast. No segundo grupo, os alunos criam o podcast de forma colaborativa. Para verificar se existem diferenças entre ambos os grupos, aplicou-se o Questionário de Inovação Educativa (CINNE), baseado no Questionário de Avaliação de Podcast, QAEP (Alarcón e Blanca, 2020), e a Escala SUS (Brooke, 2013). Os resultados indicam que existem diferenças significativas (IC 99,95%) entre os grupos nas dimensões de usabilidade e design. Não foram encontradas diferenças entre géneros. Como conclusão, este estudo validou a eficácia do podcast como estratégia didática, destacando especialmente o acesso, uso e design pelos alunos.

Palavras-chave: podcasts, aprendizagem colaborativa, usabilidade, estudantes universitários, avaliação, design.

摘要

本研究结果基于将播客作为教学工具应用，并设计用于大学生。通过定量方法，采用描述性和相关性设计，我们使用 Levene 方差齐性检验的 t 检验比较两个学生群体，以检查在学术性质、设计、可用性和学习变量方面是否存在差异，目的是比较制作播客和仅收听播客的学生之间的差异。我们拥有 461 名学生的样本，分为两组。一组由教师负责制作和执行播客的动态。在第二组中，学生共同创作播客。为了检查两组之间是否存在差异，应用了基于播客评价问卷 QAEP（Alarcón 和 Blanca, 2020）和 SUS 量表（Brooke, 2013）的教育创新问卷（CINNE）。结果表明，在可用性和设计维度上，两组之间存在显著差异（99.95%置信区间）。性别方面没有发现差异。总之，本研究验证了播客作为教学策略的有效性，特别强调了学生在访问、使用和设计方面的积极作用

关键词: 播客、协作学习、可用性、大学生、评估、设计。

ملخص

هذا البحث هو نتيجة لتطبيق البودكاست كأداة تعليمية وتعلمية ومصمم ليستخدمه طلاب الجامعات. باستخدام المنهجية الكمية، ذات التصميم الوصفي والارتباطي، استخدمنا اختبار ليفين الاستدلالي لمساواة التباين لمقارنة مجموعتين من الطلاب للتحقق مما إذا كانت هناك اختلافات في المتغيرات الأكاديمية والتصميمية وسهولة الاستخدام والتعلم، بغرض للتحقق من الاختلافات بين الطلاب الذين يقومون بإنشائها وأولئك الذين يستمعون إليها فقط. لدينا عينة مكونة من 461 طالباً، موزعين على مجموعتين. مجموعة يكون المعلمون فيها مسؤولين عن تطوير وتنفيذ ديناميكيات البودكاست. في المجموعة الثانية، يقوم الطلاب بشكل تعاوني بإنشاء البودكاست. للتحقق مما إذا كانت هناك اختلافات بين المجموعتين، تم تطبيق استبيان الابتكار التربوي (CINNE)، بناءً على استبيان تقييم البودكاست، QAEP (Alarcón y Blanca, 2020)، ومقياس SUS (Brooke, 2013). تشير النتائج إلى وجود فروق ذات دلالة إحصائية (CI ٪99.95) بين المجموعتين في أبعاد سهولة الاستخدام والتصميم. لم يتم العثور على اختلافات بسبب الجنس. في الختام، أثبتت هذه الدراسة فعالية البودكاست كاستراتيجية تعليمية، وخاصة تسليط الضوء على الوصول والاستخدام والتصميم من قبل الطلاب.

الدالة الكلمات: البودكاست، التعلم التعاوني، سهولة الاستخدام، طلاب الجامعات، التقييم، التصميم.

Introduction

Information and Communication Technologies play a key role in the development of educational processes at different stages. This became evident when the Covid-19 pandemic broke out and countries were put into lockdown, forcing universities to move teaching online (Rivera et al., 2022).

The podcast is one of the various technologies available nowadays, which are digital audio files that may include videos or images, shared over the internet and which may be listened to with a variety of players (Prisnie et al., 2022; Hitchcock et al., 2021). Podcasts facilitate chapter-by-chapter tracking through a subscription that allows the latest audio files to be available. This is one of the main features of this way of consuming up-to-date information in a simple manner (Marunevich et al., 2021). The concept of podcast is linked to Apple's iPod since the word arises from the combination of iPod and Broadcast (Hendrickson et al., 2010). However, podcasting goes beyond commercial brands or file types such as MP3, as audio files could be listened to long before this on the World Wide Web (Campbell, 2005).

In the last decade, there has been a gargantuan increase in the amount of information received through podcasting on matters and subjects related to high school and university education (Mobasheri & Costello 2021). In higher education, experiences can be found in many different branches of knowledge that lead to the reinforcement of topics from different subjects, as a resource for solving case studies, its use with mobile devices, as support for remote or non-face-to-face teaching, to work the inverted classroom or to attend to diversity (Gunderson & Cumming, 2022; Goundar & Kumar, 2021; Evans, 2008; Lashley & McCleery, 2020), in university medicine school (Mobasheri & Costello, 2021; Ow et al, 2021; Prisnie et al., 2022; Prakash et al., 2017), in support of other clinical subjects such as dentistry (Sakoto et al., 2022), in the study of business and marketing (McCarthy et al., 2021), in language learning (Yeh et al., 2021; Naidionova & Ponomarenko, 2018; Marunevich et al., 2021), in geography teaching (Kenna, 2022), in pedagogical subjects (Ausín et al., 2016; König, 2021) or in social work (Fox et al., 2021; Fronek et al., 2016), among others.

In terms of methodology, it is also used to respond to the learning difficulties of university students. The mediation of teaching through podcasts allows for greater adaptation and usability at university without the need to use expensive technologies (Cammeo et al., 2022). The podcast is analysed and incorporated as a tool for Universal Design for Learning (UDL), an important resource for sharing content, generating motivation and improving assessment (Gunderson & Cumming, 2022).

With regard to the use of podcasts in education, gender differences can be appreciated. Whereas women mainly listen to podcasts at home, men tend to listen to them in other academic or work environments (Chan-Olmsted & Wang, 2022). The latter might be more regular listeners than the former with no differences with respect to age (Tobin & Guadagno, 2022; Chadha et al., 2012).

The use of podcasts facilitates the learning process and leads to better results than when using the textbook alone (Cammeo et al., 2022). Furthermore, it enhances the rapid exchange of information on different platforms and is a tool that students value positively, especially in the period of the Sars-Cov 2 pandemic and lockdown (Fox et al., 2021; Tejedor et al., 2021). It is now far easier to access these audio files than it was one or two decades ago, due to the difficulties at the beginning related to the lack of computer experience or the access gap (Mobasheri & Costello, 2021). Nowadays, the difficulty refers to the type of content, because it may occasionally be challenging to find a specific topic linked to the educational subject to be worked on (Strickland et al., 2021). This means that teachers or students have to create specific content for certain subjects.

The length and frequency of podcasts in education varies widely, ranging from news items lasting a few minutes to regular 20-minute episodes or hour-long files (Marunevich et al., 2021). In university teaching, long seminars or complete lectures could be found, although the literature indicates that short podcasts could be

more effective from an educational point of view. Some authors point out that a podcast used as a university resource should have a duration of 10 to 20 minutes (Cosimini et al., 2017; Prakash et al., 2017). Other authors explain that the length should be linked to the type of students, with longer podcasts aimed at students working on a topic for the first time and shorter audio files for reinforcement, summaries or exam study activities (Prisnie et al., 2022). However, short podcasts of 5-15 minutes are more engaging and more likely to be shared among learners (Lashley & McCleery, 2020). This type of resource can be valued more positively by students than the use of long academic texts (Almendingen et al., 2021).

In this sense, the creation of content is an opportunity to be able to work on a subject with students, making it easier for them to study the information in depth, organise it logically and discuss the results in the classroom or other environments. In this regard, activities that lead students to work on competences and learn according to Bloom's Taxonomy (McCarthy et al., 2021) can be created. The creation of podcasts by students can facilitate the learning of the content being worked on (Pegrum et al., 2015). Students' reflective capacity is enhanced when they engage in the creation of audio files, even in those instances where the work focuses on finding, organising and sharing podcasts (Fox et al., 2021). The creation of podcasts in groups is a methodology gaining popularity in higher education as it allows contextualising the contents worked on in the different subjects. It also enhances creativity and other transversal competences (Kenna, 2022). In this regard, students have the opportunity to work in a more stimulating way, while developing academic and professional skills such as teamwork and joint reflection (Wakefield et al., 2022). They are thus given the opportunity to improve both subject planning and oral communication skills on aspects of the subject (McCarthy et al., 2021). The use of podcasts in learning can also be used to enable students to check their own progress by comparing the first audio files and the final podcasts of the subjects they have created. It is a form of work that encourages autonomous learning (Yeh et al., 2021). The use of podcasts as an assignment and a tool allows for greater motivation of learners (Johnston et al., 2021), yet there is little research related to how learners use self-created podcasts (Fronek et al., 2016; Hitchcock et al., 2021).

Therefore, if it is considered that students have been selected on the basis that some of them were not responsible for developing and implementing the dynamics of the podcast in the classroom, but the teacher, whilst others have designed and developed such dynamics and have put them into practice, it would be interesting to check whether there are differences between the two groups of students regarding the use and application of podcasts as teaching-learning tools. Furthermore, it is of interest to establish whether there are differences within the groups based on gender.

Method

Objective and hypothesis

The main objective is to assess the effectiveness of the podcast as a didactic strategy in the classroom. The hypothesis of this research is: Hy: The effect of podcasts will differ depending on whether students elaborate and produce the material in podcast format or only consume it.

Design

A quantitative methodology has been used, with a descriptive and correlational design, in a natural situation, where observations, experiences and behaviours of the subjects have been expressed, thus obtaining greater validity (Río, 2003).

Participants

The sample used for this experiment, a probabilistic sample with a simple structure, is of the purposive type, in which the participants are considered key informants. There is a total of 461 university students, 74.2% of whom are women (n=342) and 25.8% men (n=119), aged between 18 and over 40 years, with the 18-24 age range having the highest percentage (94.1%), and divided into two groups: group 1 (G1), 243 students (52.7%), considered as passive subjects as they have received the dynamic but have not created or designed the podcast; group 2 (G2), 218 students (43.7%), considered as active

subjects as they have received the dynamic and have also designed and created the podcast.

When looking at other socio-demographic variables, it is worth noting that almost half of the sample declared that they were studying Primary Education (49.2%; n=227), followed by Pre-school Education and Social Education, with values of 23.4% and 21.7%, respectively. Similarly, 67% of students say that they use social networks whilst only 5.2% (n=24) say that they use social networks rather "little" or "not at all".

Finally, in relation to the variable podcasts, 53.8% of the students indicate that they have a moderate knowledge of podcasts (n=248) and 19.3% indicate that they have a high degree of knowledge (19.3%; n=89). Regarding the degree of listening, 53.6% of the students show a moderate and high level, whereas 36.4% show the opposite. As for the degree of elaboration, the scores are very similar; 50.6% of the sample is positioned in the values "not at all" and "little", whilst 49.4% is at the opposite pole, "somewhat" and "a lot".

Instruments

The Questionnaire on Educational Innovation for University Students (CINNE) used in this study (see appendix) consists of a total of 30 items related to dimensions such as the use, design, content and learning of the application of podcasts in the classroom as a teaching-learning tool, whereby the student is asked to state the degree of agreement with the content of the statements. The items are polytomous and are rated from "strongly disagree" to "strongly agree". In addition, the questionnaire consists of items related to socio-demographic variables such as gender, age, grade, whether the student has repeated a year and the level of use of: social networks, knowledge of podcasts, listening to podcasts, and elaboration or creation of podcasts.

I order to assess the dimensions described above between the two groups of students studied in this paper, i.e. those who have designed and created the podcast and those who have not, the CINNE is based on two scales: the Questionnaire for Assessment of Educational Podcasts, QAEP (Alarcón and Blanca, 2020), with 20 items, and the SUS Scale (Brooke, 2013), which assesses the usability of devices, tools or applications, their features, learning and functionality (10 items).

The QAEP is an instrument that measures students' opinion of educational podcasts on a four-factor factorial structure that explains more than 60% of the total variance: (C1) Access and Use, (C2) Design and Structure, (C3) Content Appropriateness, and (C4) Value as a Tool and Learning Aid.

On the other hand, the SUS Scale is an instrument that evaluates the usability of tools and applications, their characteristics, learning and functionality, as an intuitive and communication tool. The items that make up this scale are based on a factorial solution of two factors that explain a total variance of over 55%: Usability and Learning.

Data Analysis

The questionnaire was applied in the context and field of education research and, as a result, the first step was to analyse the factorial structure of the two Scales that make up the CINNE. In this sense, multivariate indicators or measures were used to confirm whether the correlation matrix of the items can be factored and thus subjected to factor analysis. A Principal Component Analysis (PCA) was performed for each of the scales that make up the CINNE using varimax rotation, since the aim is to identify the number and composition of components needed to summarise the scores observed in a large set of observed variables (Lloret-Segura et al., 2014: 1153).

Secondly, the internal consistency of the resulting components is analysed, in order to verify whether the two scales of the CINNE have an acceptable reliability to be considered an effective and reliable assessment instrument. To measure this internal consistency, Cronbach's α was used.

Thirdly, based on the components or factors extracted, these are subjected to Levene's t-test for independent samples, the aim of which is to test the equality of means and variances between two groups, in this instance, by group and gender, to see if there are differences.

The data analysis was carried out using the IBM SPSS v22.0 statistical programme.

Procedure

Podcasts were used as a technological resource to work on the contents of different subjects inside and outside the classroom. The students in Group 1 worked with a podcast prepared by the teacher, with an approximate duration of 10 minutes, on specific subject content. Later, in the classroom, they carried out a process of reflection and debate on what they had listened to and the subject they were working on. The students in Group 2 took an active part in the planning and creation of a podcast in collaborative groups, with a similar length, taking into account the contents of the subject in order to subsequently present and exchange it with the rest of their classmates and moderate the final debate in the classroom. Upon completion of the experience, they were asked to answer the CINNE questionnaire anonymously. In terms of ethical considerations, student data were safeguarded, guaranteeing the anonymity of the participants.

Results

a) Factorial and Reliability Analysis

The 20 items comprising the Questionnaire for Assessment of Educational Podcasts (QAEP) were subjected to PCA: KMO= .880; Bartlett's test of sphericity, p = .000; determinant = .001, the alternative hypothesis is accepted, the matrix determinant is different from 1; eigenvalues >1; factor saturations > .40. The PCA reveals a four-component factor structure responsible for 60.17% of the variance.

Similarly, the PCA performed on the 10 items of the SUS Scale shows that: KMO= .845; Bartlett's test of sphericity, p.= .000; determinant= .050; eigenvalues >1; factor saturations > .40. The rotated component matrix yields a two-factor factorial solution explaining 54.4% of the variance. Cronbach's α indicates a value of .879 for the QAEP item set, while the SUS Scale shows an internal consistency of α= .747.

These data reveal the goodness of fit of the two-scale model. Table 1 illustrates the number of items that make up each component or factor, the final factor structure obtained, the variance explained and the internal consistency of both measurement instruments. For the QAEP Scale the components correspond to F1 Access-Use, F2 Design and Structure, F3 Content Adequacy and F4 Learner Support. For the SUS Scale the components are F1 Usability and F2 Learning

Los resultados obtenidos, tanto en el Cuestionario QAEP como en la Escala SUS, verifican las estructuras factoriales de ambos instrumentos, con lo cual se han generado soluciones factoriales parsimoniosas que muestran el ajuste del modelo aplicado. Por tanto, podemos decir que las dos Escalas presentan indicadores de validez y de fiabilidad.

The results obtained, both in the QAEP Questionnaire and in the SUS Scale, verify the factor structures of both instruments, thus generating parsimonious factor solutions that show the fit of the applied model. Therefore, it could be said that both scales present validity and reliability indicators.

Table 1. Factorial structure, number of items per component and reliability on the QAEP and SUS Scales

Factorial Structure of the QAEP Questionnaire

Items	Components			
	F1	F2	F3	F4
V2: I was able to watch the podcasts on different devices (smartphone, PC, etc.).	,792			
V3: I was able to watch the podcasts in different locations.	,775			
V4: The podcasts were easy to find online.	,697			
V1: It was easy to access the podcasts.	,572			
V6: The design of the podcasts (lighting, scene, colours, charts, graphs, etc.) is attractive.		,802		
V7: The presentation format of the podcasts is good for educational needs.		,714		
V9: Audio and video are correctly synchronised.		,628		
V8: Audio of podcasts is clear.		,515		
V5: The length of the podcasts is adequate for the understanding of their content.		487		
V13: The content of the podcasts is relevant to the subject matter.			,712	
V12: The examples used in the podcasts are didactically appropriate.			,704	
V11: The terminology used in the podcasts is appropriate.			,628	
V10: The podcasts provide a good summary of the topic being discussed.			,581	
V20: The podcasts gave me a better understanding of the subject content.				,782
V17: The podcasts helped me to learn about the topic.				,778
V16: The podcasts have made the subject more enjoyable.				,742
V15: The podcasts reinforced my understanding of the subject matter.				,727
V18: I am satisfied with the podcasts as a learning tool for this subject.				,660
V14: The podcasts were a good help in learning about the subject.				,649
V19: The podcasts encourage self-learning in students.				,629
α Cronbach	.706	.740	.733	.869

Analysis of main components. Rotation method: Varimax normalisation with Kaiser.a The rotation has converged in 9 items.

Factorial Structure of the SUS Scale

Items	Components	
	F1	F2
V25: I think the various functions in this tool were well integrated.	,769	
V26: I think the tool is consistent (coherent).	,718	
V29: I would feel very confident using the tool.	,717	
V28: I find the tool very intuitive.	,705	
V21: I think I would like to use this tool frequently.	,679	
V23: I think the tool is easy to use.	,670	
V27: I think most people would learn to use this tool very quickly.	,639	
V22: I find the tool quite simple.	,585	
V24: I think I would need the support of a technical person to be able to use this tool.		,849
V30: I would need to learn a lot of things before I could start using this tool.		,836
α Cronbach	.843	.657

Analysis of main components. Rotation method: Varimax normalisation with Kaiser.
a The rotation has converged in 3 items

b) Levene's t-test for independent samples

Regarding the QAEP Questionnaire and the SUS Scale, there is an interest in determining whether there are significant differences in the components extracted according to the group and according to gender. Given that the variables are continuous and normal, the t-test was applied for two independent groups.

b.1. QAEP Questionnaire

The results shown in tables 2 and 3 indicate that there are differences (p(t) < .05) in two components; therefore, the null hypothesis is rejected and the alternative is accepted: there are statistically significant differences in these two factors depending on the group: "Access and Use" (CI99.95%; F459= .945; t=.005) and "Design and Structure" (CI99.95%; F459= .040; t=.005). Students in Group 2 perceive greater ease of access to audio files and how to play them on different devices. Meanwhile, Group 1 students perceive the design and structure of the podcasts, the presentation format and the quality of the audio better

Table 2. Mean and Standard Deviation of the QAEP questionnaire components as a function of Group

	GROUP	N	Mean	Standard Deviation	Standard mean error
F1 USE AND ACCESS	G_1	243	**-.12**	1,032	.066
	G_2	218	**.14**	.947	.064
F2 DESIGN AND STRUCTURE	G_1	243	**.12**	.999	.064
	G_2	218	**-.14**	.985	.067
F3 ADAPTATION TO THE CONTENT	G_1	243	.01	.976	.063
	G_2	218	-.01	1,028	.070
F4 SUPPORTS LEARNING	G_1	243	-.07	.951	.061
	G_2	218	.08	1,049	.071

G_1: Group 1: The teacher develops and designs the Podcast
G_2: Group 2: Students develop and design the Podcast

Table 3. QAEP Questionnaire. Levene's t-test for independent samples as a function of Group

		Levene's test for variance equality		T test for the equality of means						
		F	Sig.	t	gl	Sig. (bilateral)	Mean differences	Standard error of the difference	95% Reliability interval for the difference	
		Lower	Higher	Lower	Higher	Lower	Higher	Lower	Higher	Lower
ACCESS AND USE	Equal variances have been assumed	.945	.331	-2,791	459	**.005**	-.258	.093	-.440	-.076
	Equal variances have not been assumed			-2,803	458,742	**.005**	-.258	.092	-.440	-.077
DESIGN AND STRUCTURE	Equal variances have been assumed	.040	.842	2,853	459	**.005**	.264	.093	.082	.446
	Equal variances have not been assumed			2,855	454,871	**.004**	.264	.093	.082	.446
ADAPTATION TO THE CONTENT	Equal variances have been assumed	.387	.534	.117	459	.907	.011	.093	-.173	.194
	Equal variances have not been assumed			.117	447,422	.907	.011	.094	-.173	.195
SUPPORTS LEARNING	Equal variances have been assumed	.030	.862	-1,653	459	.099	-.154	.093	-.337	.029
	Equal variances have not been assumed			-1,644	440,339	.101	-.154	.094	-.338	.030

Difference is significant at level <.05 (bil)

The data in Tables 4 and 5 show that there is equality of means and that p(t) > .05. The null hypothesis of no difference between the groups is not rejected (but accepted). Therefore, there are no statistically significant differences in the four components of the QAEP according to gender. In other words, there are no gender differences between Group 1 and Group 2 students in the aspects related to: the ease of accessing and using the audio files, the way in which they are designed and structured, or the help the podcasts offer to their learning process.

Table 4. Mean and Standard Deviation of the QAEP questionnaire components according to Gender

	Gender	N	Mean	Standard Deviation	Standard mean error
ACCESS AND USE	MALE	119	.07	.969	.089
	FEMALE	342	-.02	1,011	.055
DESIGN AND STRUCTURE	MALE	119	-.10	1,065	.098
	FEMALE	342	.04	.975	.053
ADAPTATION TO THE CONTENT	MALE	119	-.09	.973	.089
	FEMALE	342	.03	1,009	.055
SUPPORTS LEARNING	MALE	119	-.14	1,039	.095
	FEMALE	342	.05	.983	.053

Table 5 QAEP Questionnaire. Levene's t-test for independent samples by gender

		Levene's test for variance equality		T test for the equality of means						
		F	Sig.	t	gl	Sig. (bilateral)	Mean differences	Standard error of the difference	95% Reliability interval for the difference	
		Lower	Higher	Lower	Higher	Lower	Higher	Lower	Higher	Lower
ACCESS AND USE	Equal variances have been assumed	.324	.569	.831	459	.406	.088	.106	-.121	.298
	Equal variances have not been assumed			.848	213,619	.397	.088	.104	-.117	.294
DESIGN AND STRUCTURE	Equal variances have been assumed	1,111	.292	-1,310	459	.191	-.139	.106	-.348	.070
	Equal variances have not been assumed			-1,256	191,322	.211	-.139	.111	-.358	.080
ADAPTATION TO THE CONTENT	Equal variances have been assumed	.185	.667	-1,144	459	.253	-.122	.106	-.331	.087
	Equal variances have not been assumed			-1,164	212,594	.246	-.122	.105	-.328	.084
SUPPORTS LEARNING	Equal variances have been assumed	.892	.345	-1,789	459	.074	-.190	.106	-.399	.019
	Equal variances have not been assumed			-1,742	196,419	.083	-.190	.109	-.405	.025

The difference is significant at level <.05 (bil)

b.2. SUS Scale

Tables 6 and 7 show that there are statistically significant differences in means and, therefore, p(t) < 0.05, in the "Usability" component, CI99.95%; F459= 1.948; t=.002).

In this regard, the alternative hypothesis is accepted. Students in Group 1 concluded that podcasts could be used frequently, are easy to use and can be manipulated intuitively.

Table 6. Mean and Standard Deviation of the SUS Scale components as a function of Group

	GROUP	N	Mean	Standard Deviation	Standard mean error
USABILITY	G_1	243	**.14**	.932	.060
	G_2	218	**-.15**	1,052	.071
LEARNING	G_1	243	-.08	1,005	.064
	G_2	218	.09	.989	.067

G_1: Group1: The teacher creates and designs the Podcast
G_2: Group 2: Students create and design the Podcast

Table 7. SUS scale. Levene's t-test for independent samples as a function of Group

		Levene's test for variance equality		T test for the equality of averages						
		F	Sig.	t	gl	Sig. (bilateral)	Mean differences	Standard error of the difference	95% Reliability interval for the difference	
		Lower	Higher	Lower	Higher	Lower	Higher	Lower	Higher	Lower
USABILITY	Equal variances have been assumed	1,948	.164	3,152	459	**.002**	.291	.092	.110	.473
	Equal variances have not been assumed			3,131	436,213	**.002**	.291	.093	.108	.474
LEARNING	Equal variances have been assumed	.035	.852	-1,788	459	.074	-.166	.093	-.349	.016
	Equal variances have not been assumed			-1,790	455,066	.074	-.166	.093	-.349	.016

The difference is significant at level <.05 (bil)

As can be seen in tables 8 and 9, and in the same way as with the QAEP questionnaire, there are no significant differences in the means of the SUS Scale components according to gender, since p(t) > .05. Therefore, the null hypothesis is accepted, i.e., there are no statistically significant differences in the two components obtained from the SUS Scale.

Table 8. Mean and Standard Deviation of SUS Scale components by Gender

	Gender	N	Mean	Standard Deviation	Standard mean error
USABILITY	MALE	119	.14	.977	.090
	FEMALE	342	-.05	1,005	.054
LEARNING	MALE	119	-.02	1,047	.096
	FEMALE	342	.01	.984	.053

Table 9. SUS scale. Levene's t-test for independent samples by gender

		Levene's test for variance equality		T test for the equality of averages						
		F	Sig.	t	gl	Sig. (bilateral)	Mean differences	Standard error of the difference	95% Reliability interval for the difference	
		Lower	Higher	Lower	Higher	Lower	Higher	Lower	Higher	Lower
USABILITY	Equal variances have been assumed	.312	.577	1,754	459	.080	.186	.106	-.022	.395
	Equal variances have not been assumed			1,778	210,969	.077	.186	.105	-.020	.393
LEARNING	Equal variances have been assumed	.005	.945	-.251	459	.802	-.027	.107	-.236	.183
	Equal variances have not been assumed			-.244	195,291	.808	-.027	.110	-.243	.190

The difference is significant at level <.05 (bil)

Discussions and Conclussions

Currently, the dissemination of educational content through podcasts is emerging as a novel learning strategy with great benefits for learning (Samaniego et al., 2022), which is why different studies support the suitability of podcasts as an effective tool to facilitate teaching and learning in university environments (García-Hernández et al., 2022). This paper has assessed the application of the technological resource based on podcasts as a teaching-learning tool in two groups of students; one group received training in the classroom, yet was not involved in the design, use and dynamics of this technology (passive subjects) whilst the other group, which also received training oriented on podcasts, was an active player in the development, creation, use and implementation of this resource in the classroom.

Prior to the study of intergroup relations, a principal components analysis was carried out to corroborate the factorial structure and reliability of the two scales which make up the questionnaire applied to the students. The factorial solutions reveal that they are parsimonious, and the internal consistency of both scales is quite remarkable; these results indicate that the aspects and indicators indicated meet the methodological and psychometric requirements to accept the validity and reliability of the measurement instruments.

Once the data had been processed, the relationships between the two groups was analysed. To do this, Levene's t-test procedure or t-test for equality of variances was used to compare two independent samples. The results show that there are differences between the two groups in the dimensions or components referring to the "Usability" and "Design and Structure" of the podcasts. Different studies reveal that students perceive podcasts as an easily accessible tool in terms of its use (Portilla, 2019; Riddell, 2020). The same is not true for gender, where the data obtained reveal that there are no significant differences in any of the factors analysed. These data suggest that there are no gender differences between Group 1 and Group 2 students in the

aspects related to the ease of accessing and using the audio files, the way they are designed and structured, or the help the podcasts offer to their learning. There are also no gender-related differences in the usability of audio files. In contrast, some studies indicate that women, compared to men, have more limitations when accessing the internet and spend less time listening to podcasts during their free time compared to their male counterparts (Chan-Olmsted & Wang, 2022; Ramos García & Caurcel Cara, 2011). With regard to the dimensions of "Access and Use" and "Design and Structure" it was found that learners in Group 2 perceived that it is easier to access the audio files and their reproduction on different devices. Students in Group 1, with teacher-produced podcasts, perceive the design and structure of the audio files, the presentation format and the quality of the file better. There are no differences in relation to "Appropriateness to Content" and "Aids to Learning" in the two groups. In terms of usability, there are differences between students in Group 1, as opposed to Group 2, who state that podcasts are a simple tool and can be manipulated intuitively. Andrade and Paez (2021) support this conclusion by considering that the implementation of podcasting takes place through platforms or tools in the context of strengthening learning processes. The differences with Group 2 may be due to the fact that the latter group worked on their design and creation, having to produce a product that also addressed the contents of the subject, and included these aspects in their evaluations. The elaboration and organisation of podcasts puts the student in the role of active creator of the subject they are studying. This creates opportunities for reflection and discussion with peers and teachers (McCarthy et al., 2021). Therefore, the creation of podcasts is a beneficial tool for increasing student participation and allows them to delve into the subjects they are studying in a different way (Fox et al., 2021). It is an effective resource for working on subjects, facilitating student autonomy and self-learning, generating critical reasoning and encouraging divergent thinking and creative task solving (Gil and Ortega-Quevedo, 2022; Ikhsan et al., 2020). Podcasts, being a novel element, are a valuable tool for teachers to generate motivation and facilitate the learning process of their students (Galán, 2018). Furthermore, studies by Indahsari (2020) revealed how the use of podcasts as a learning resource fostered relationships between teachers and students. Acosta Mejía et al. (2022) pointed out that the innovative strategies used by teachers with this tool facilitate the development of competences and lead to more creative and effective learning. The ease of being able to listen to and use free content that reinforces university subjects is an added value in the use of podcasts (Brehm, 2022). However, subject-specific content is not always available. Moreover, teachers may sometimes need to be sensitised to use this type of resource in the classroom (Ifedayo et al., 2021).

In conclusion, this study has validated the effectiveness of the podcast as a teaching strategy. Its ease of use and the way it presents the content make it a beneficial tool for the teaching-learning process. The active role of the student in participating in the creation of the podcasts is especially highlighted. One of the factors to be taken into account in the use of podcasts during the educational process is the increase in the number of platforms and companies that generate paid subscription content. However, it is necessary to continue to focus on access to content that is shared and free of charge, allowing students to exchange it on a not-for-profit basis (Brehm, 2022).

Limitations and prospective

One limitation of this research is to have considered developing it from the perspective of the test-retest reliability procedure or method, using intraclass correlation indicators for its study. With this type of analysis, the pre-post measures of the factors extracted from the two scales that make up the questionnaire applied would be studied. In this regard, the sample of students would rest in a single group with the particularity that the same questionnaire would be applied twice, a

first time (pre) in which the contents would be worked on without the podcast resource and, a second time (post), in which the same contents and tasks would be studied with the podcast resource, all with the aim of evaluating whether changes occur in the object of study, i.e. whether the application of the podcast as a teaching-learning tool in the classroom is useful and valid. On the other hand, it would be interesting to investigate the long-term effects of the continuous use of podcasts during the learning process, considering the sustained impact on knowledge and skill retention over time.

Acknowledgements

This work was financed by The Next Generation EU (NGEU) fund under "Real Decreto 641/2021, de 27 de julio, por el que se regula la concesión directa de subvenciones a universidades públicas para la modernización y digitalización del sistema universitario español en el marco del plan de recuperación, transformación y resiliencia (UNIDIGITAL)", with the project titled PIE-11 Liquidthinker and improving learning through podcasting and kialo edu as multi-channel communication tools for debate.

References

Acosta Mejía, D., Velandia Sacristán, D. R., y Martínez Álvarez, F. F. (2022). Dos enfoques de la motivación del aprendizaje. *Revista Cubana de Educación Superior*, *41*(1).

Alarcón, R., & Blanca, M. J. (2020). Development and Psychometric Properties of the Questionnaire for Assessing Educational Podcasts (QAEP). *Frontiers in Psychology*, (11), 1-9. https://doi.org/10.3389/fpsyg.2020.579454

Almendingen, K., Torbjørnsen, A., Sparboe-Nilsen, B., Kvarme, L. G., & Saltyte Benth, J. (2021). Small group student-produced podcasts were favoured as assignment tool for large-scale interprofessional learning: An exploratory study among health, social care, and teacher education program. *Frontiers in Education*, 6, 365-375. https://doi.org/10.3389/feduc.2021.622716

Andrade, R. F., y Páez Paredes, M. (2021). El podcast como herramienta de retroalimentación en la evaluación de actividades virtuales. *Mendive. Revista de Educación*, *19(*1), 16-29.

Ausín, V., Abella, V., Delgado, V., y Hortigüela, D. (2016). Aprendizaje basado en proyectos a través de las TIC: Una experiencia de innovación docente desde las aulas universitarias. *Formación universitaria*, *9*(3), 31-38. http://dx.doi.org/10.4067/S0718-50062016000300005

Brehm, W. (2022). Podcasting and Education: Reflections on the Case of FreshEd. *ECNU Review of Education*, *0*(0), 1-8. https://doi.org/10.1177/20965311221094860

Brooke, J. (2013). SUS: a retrospective. *Journal of usability studies*, *8*(2), 29-40

Cammeo, C., Prestera, G., Massaro, D., Marchetti, A., & Cavallini, F. (2022). Teaching clinical reasoning to psychology students: an exploratory study on the potential of a podcast training. *Journal of Clinical & Developmental Psychology*. online, 1-15. https://doi.org/10.13129/2612-4033/0110-3394

Campbell, G. (2005). Podcasting in education. *EDUCAUSE*, 5, 33-44.

Chadha, M., Avila, A., & Gil de Zúñiga, H. (2012). Listening in: Building a profile of podcast users and analyzing their political participation. *Journal of Information Technology & Politics*, *9*(4), 388-401. http://doi.org/10.1080/19331681.2012.717481

Chan-Olmsted, S., & Wang, R. (2022). Understanding podcast users: Consumption motives and behaviors. *New media & society*, *24*(3), 684-704. https://doi.org/10.1177/1461444820963776

Cosimini, M. J., Cho, D., Liley, F., & Espinoza, J. (2017). Podcasting in medical education: how long should an educational

podcast be?. *Journal of graduate medical education*, *9*(3), 388-389. https://doi.org/10.4300/JGME-D-17-00015.1

Evans, C. (2008). La efectividad del m-learning en forma de lecturas de revisión de podcasts en la educación superior. *Informática y Educación*, *50*(2), 491–498. https://doi.org/10.1016/j.compedu.2007.09.016

Fox, M., McHugh, S., Thomas, D., Kiefel-Johnson, F., & Joseph, B. (2021). Bringing together podcasting, social work field education and learning about practice with Aboriginal peoples and communities. *Social Work Education*, 40, 1-17. https://doi.org/10.1080/02615479.2021.1972963

Fronek, P., Boddy, J., Chenoweth, L., & Clark, J. (2016). A report on the use of open access podcasting in the promotion of social work. *Australian Social Work*, *69*(1), 105–114. https://doi.org/10.1080/0312407X.2014.991338

Galán Camacho, F. (2018). *Aplicaciones del Podcast en el aula de ELE.* UAH.

García Hernández, C., Ruiz Fernández, J., Herrán Alonso, M., y Gallinar Cañedo, D. (2022). Podcast para el aprendizaje y la difusión de los Fundamentos de la Geografía. *Cuadernos Geográficos, 61*(1), 168-188. https://doi.org/10.30827/cuadgeo.v61i1.18491

Gil, C y Ortega-Quevedo, V (2022). El uso de podcast como instrumento de evaluación sobre el aprendizaje en la enseñanza de las ciencias. *REIDOCREA*, *11*(2), 14-27. https://doi.org/10.30827/Digibug.72231

Goundar, M. S., & Kumar, B. A. (2021). The use of mobile learning applications in higher education institutes. *Education and Information Technologies*, *27*(1), 1213–1236. https://doi.org/10.1007/ s10639-021-10611-2

Gunderson, J. L., & Cumming, T. M. (2022). Podcasting in higher education as a component of Universal Design for Learning: A systematic review of the literature. *Innovations in Education and Teaching International*, 1-11. https://doi.org/10.1080/14703297.2022.2075430

Hendrickson, L., Jokela, R. H., Gilman, J., Croymans, S., Marczak, M., Zuiker, V. S., & Olson, P. D. (2010). The viability of podcasts in Extension Education: Financial Education for College Students. *Journal of Extension*, 48, 1–9.

Hitchcock, L. I., Sage, T., Lynch, M., & Sage, M. (2021). Podcasting as a pedagogical tool for experiential learning in social work education. *Journal of Teaching in Social Work*, *41*(2), 172-191. https://doi.org/10.1080/08841233.2021.1897923

Indahsari, D. (2020). Using podcast for EFL students in language learning. JEES *Journal of English Educators Society*, *5*(2), 103-108. https://doi.org/10.21070/jees.v5i2.767

Ifedayo, A. E., Ziden, A. A., & Ismail, A. B. (2021). Mediating effect of behavioural intention on podcast acceptance. *Education and Information Technologies*, *26*(3), 2767-2794. https://doi.org/10.1007/s10639-020-10385-z

Ikhsan, J., Sugiyarto, K., & Astuti, T. N. (2020). Fostering student's critical thinking through a Virtual reality laboratory. *International Journal of Interactive Mobile Technologies (iJIM)*, *14*(08), 183. https://doi.org/10.3991/ijim.v14i08.13069

Johnston, D., Rockhill, C., & Pastore, D. (2021). The effectiveness of podcasts in sport management education part two: A qualitative analysis. *Journal of Hospitality, Leisure, Sport & Tourism Education*, 29, 100338. https://doi.org/10.1016/j.jhlste.2021.100338

Kenna, T. (2022). Podcasting urban geographies: examining the utility of

student-generated research podcasts for deep learning and education for sustainable development. *Journal of Geography in Higher Education*, online, 1-20. https://doi.org/10.1080/03098265.2022.2122030

König, L. (2021). Podcasts in higher education: teacher enthusiasm increases students' excitement, interest, enjoyment, and learning motivation. *Educational Studies*, *47*(5), 627-630. https://doi.org/10.1080/03055698.2019.1706040

Lashley, M., & McCleery, R. (2020). Intensive Laboratory experiences to safely retain experiential learning in the transition to online learning. *Ecology and Evolution*, *10*(22), 12613-12619. https://doi.org/10.1002/ece3.6886

Lloret-Segura, S., Ferreres-Traver, A., Hernández-Baeza, A., y Tomás-Marco, I. (2014). El análisis factorial exploratorio de los ítems: una guía práctica, revisada y actualizada. *Anales de psicología*, *30*(3), 1151-1169. http://dx.doi.org/10.6018/analesps.30.3.199361

Marunevich, O., Bessarabova, O., Shefieva, E., & Razhina, V. (2021). Impact of podcasting on English learners' motivation in asynchronous e-learning environment. In *SHS Web of Conferences* (Vol. 110). EDP Sciences. https://doi.org/10.1051/shsconf/202111003006

McCarthy, S., Pelletier, M., & McCoy, A. (2021). Talking together: using intercollegiate podcasts for increased engagement in marketing education. *Marketing Education Review*, *31*(2), 125-130. https://doi.org/10.1080/10528008.2021.1875849

Mobasheri, A., & Costello, K. E. (2021). Podcasting: an innovative tool for enhanced osteoarthritis education and research dissemination. *Osteoarthritis and Cartilage Open*, *3*(1), 100130. https://doi.org/10.1016/j.ocarto.2020.100130

Naidionova, A. V. & Ponomarenko, O. G. (2018). Use of the podcasting technology to develop students´listening skills. *Information Technologies and Learning Tools*, *63*(1), 177-185. https://doi.org/10.33407/itlt.v63i1.1962

Ow, G. M., Shipley, L. C., Nematollahi, S., & Stetson, G. V. (2021). Morning report for all: a qualitative study of disseminating case conferences via podcasting. *BMC medical education*, *21*(1), 1-10. https://doi.org/10.1186/s12909-021-02799-1

Pegrum, M., Bartle, E., & Longnecker, N. (2015). Can creative podcasting promote deep learning? The use of podcasting for learning content in an undergraduate science unit. *British Journal of Education Technology*, *46*(1), 142–152. https://doi.org/10.1111/bjet.12133

Portilla, C. S. F. (2019). Percepción de los estudiantes de una universidad pública de Lima respecto del podcast como herramienta de aprendizaje. *Revista Estudios en Educación*, *2*(3), 35-44

Prakash, S. S., Muthuraman, N., & Anand, R. (2017). Short-duration podcasts as a supplementary learning tool: perceptions of medical students and impact on assessment performance. *BMC medical education*, *17*(1), 1-14. https://doi.org/10.1186/s12909-017-1001-5

Prisnie, J., Poon, G. W. S., Stokes, P., & Brager, N. (2022). Utilization of Moderate-Duration Summary Podcasts Compared to Long-Duration Podcasts for Psychiatry Education by Canadian Pre-clerkship Medical Students. *Academic Psychiatry*, *46*(1), 133-137. https://doi.org/10.1007/s40596-021-01538-4

Ramos García, A. M., & Caurcel Cara, M. J. (2011). Los podcast como herramienta de enseñanza-aprendizaje en la universidad.

Profesorado. *Revista de Currículum y Formación de Profesorado*, *15*(1), 151-162.

Riddell, J., Robins, L., Brown, A., Sherbino, J., Lin, M., & Ilgen, J. S. (2020). Independent and interwoven: a qualitative exploration of residents' experiences with educational podcasts. *Academic Medicine, 95*(1), 89-96. https://doi.org/10.1097/ACM.0000000000002984

Río, D. (2003). *Métodos de investigación en educación. Proceso y diseños no complejos* (Vol. I). UNED.

Rivera, V. J., Payan, E. B., Cervantes, J. M., Díaz, R. V., y Rivera, O. J. (2022). Podcast como recurso educativo en la impartición de una materia en ingeniería. *Revista Electrónica sobre Tecnología, Educación y Sociedad*, 9(17). 1-14.

Sakoto, F., Hermann, E. y Castro, A. (2022). Podcast en la educación superior: estrategias metodológicas para la enseñanza-aprendizaje en Odontología. *Dominio de las Ciencias*, *8*(3), 911-927. http://dx.doi.org/10.23857/dc.v8i3

Samaniego, J., Lavid, E., Vásconez, S., & Neira, M. (2022). Educational podcast, a link to auditory learning. In *INTED2022 Proceedings* (pp. 7791-7797). IATED.

Strickland, B. K., Brooke, J. M., Zischke, M. T., & Lashley, M. A. (2021). Podcasting as a tool to take conservation education online. *Ecology and Evolution*, *11*(8), 3597-3606. https://doi.org/10.1002/ece3.7353

Tejedor, S., Cervi, L., Pérez-Escoda, A., Tusa, F., & Parola, A. (2021). Higher education response in the time of coronavirus: perceptions of teachers and students, and open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 43. https://doi.org/10.3390/joitmc7010043

Tobin, S. J., & Guadagno, R. E. (2022). Why people listen: Motivations and outcomes of podcast listening. *Plos one*, *17*(4), e0265806. https://doi.org/10.1371/journal.pone.0265806

Wakefield, A., Pike, R., & Amici-Dargan, S. (2022). Learner-generated podcasts: an authentic and enjoyable assessment for students working in pairs. *Assessment & Evaluation in Higher Education*, online, 1-13. https://doi.org/10.1080/02602938.2022.2152426

Yeh, H. C., Chang, W. Y., Chen, H. Y., & Heng, L. (2021). Effects of podcast-making on college students' English speaking skills in higher education. *Educational Technology Research and Development*, *69*(5), 2845-2867. https://doi.org/10.1007/s11423-021-10026-3

Appendix

QAEP Questionnaire

Items
V1: It was easy to access the podcasts
V2: I was able to see the podcasts on different devices (smartphone, PC, etc.)
V3: I was able to see the podcasts in different places
V4: Podcasts were easy to find online
V5: The duration of the podcasts is adequate for understanding their content
V6: The design of the podcasts (lighting, scene, colors, tables, graphs, etc.) is attractive
V7: The podcast presentation format is good for educational needs
V8: Podcast audio is clear
V9: Audio and video are correctly synchronized
V10: Podcasts provide a good summary of the topic being discussed
V11: The terminology used in the podcasts is appropriate
V12: The examples used in the podcasts are suitable for teaching purposes
V13: Podcast content is relevant to the topic
V14: The podcasts were a good help to learn about the topic
V15: The podcasts reinforced my understanding of the topic
V16: Podcasts have made the topic more enjoyable
V17: The podcasts were used to learn about the topic
V18: I am satisfied with podcasts as a learning tool for this subject
V19: Podcasts encourage students' autonomous learning
V20: Podcasts gave me a better understanding of the subject content
V21: I think I would like to use this tool frequently
V22: I find the tool quite simple
V23: I think the tool is easy to use
V24: I think I would need the support of a technical person to be able to use this tool
V25: I think the various functions in this tool were well integrated
V26: I think the tool is consistent (coherent)
V27: I think most people would learn to use this tool very quickly
V28: I find the tool very intuitive
V29: I would feel very safe using the tool
V30: I would need to learn many things before starting to use this tool

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Competing of interests: MGS expresses that there are no conflicts of interest when writing the paper.

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Competing of interests: LMA expresses that there are no conflicts of interest when writing the paper.

Revista **EL**ectrónica de **I**nvestigación y **EV**aluación **E**ducativa

E-Journal of Educational Research, Assessment and Evaluation

[ISSN: 1134-4032]