



Learning of Audacity for the edition and production of digital didactic contents

El aprendizaje de Audacity para la edición y producción de contenidos didácticos digitales

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RESUMEN

En la sociedad actual resulta indispensable proporcionar una capacitación adecuada a los futuros docentes para que puedan desarrollar metodologías innovadoras, donde las TIC y los recursos didácticos digitales desempeñan un papel clave y permiten que los conocimientos y habilidades del alumno tengan un desarrollo exitoso. Esta investigación se aborda desde una metodología cuantitativa, mediante el uso de un cuestionario creado ad hoc sobre aprendizaje y la evaluación de la herramienta Audacity para la creación de recursos didácticos digitales en el Grado de Educación Infantil de la Universidad de Córdoba. Los resultados muestran una valoración positiva de la experiencia vivida, así como de la herramienta estudiada ■

ABSTRACT

In present society it is essential to provide the necessary training to future teachers so they can accomplish innovative teaching and learning methodologies, where ICT and digital learning resources play a key role that will enable the student's knowledge and skills to be successfully developed. This research is approached from a quantitative methodology, by using a questionnaire created ad hoc about the learning and the assessment of the Audacity software tool for creating digital didactic resources, in the Early Childhood Education Degree from the University of Cordoba. The results obtained show a positive assessment of the tool studied and its subsequent use for audiovisual productions ■

PALABRAS CLAVE

TIC, recursos digitales, educación infantil, formación inicial docente.

KEYWORDS

ICT, digital resources, children education, initial teaching training.



Introduction

Current education models are characterized by the transformation of education that is focused on the mere transmission of knowledge, where the student takes on an exclusively passive role, towards the new methodological focus of active learning, where the student is the protagonist. Therefore, the teacher's main role in these new models is as a guide within the teaching-learning process itself, where the use of technological tools and resources become more important, as they imply a greater involvement of the students and an improvement of the results through the development of their autonomy (Dans & Muñoz, 2016; Roblizo & Cózar, 2015). Some examples of these new models are: project-based learning, personalized learning or scientific research (EURYDICE, 2011). Consequently, the teacher must possess the training, abilities and skills needed for the integration of the ICT into the teacher's and the classroom's education programming; they must know what resources exist, where these can be found and know how to integrate them into their daily routines.

Therefore, the 21st century teachers need to learn how to use the ICT in a practical manner, and need to broaden their knowledge throughout their learning stages (Marin & Romero, 2009; Flores, 2018). Thus, it should be noted that the use of specific technological resources, such as personal learning environments (PLE), e-learning platforms or social networks, could be resources that should be taken into account within the methodologies used that favor the learning and integration of the ICT into the classroom (Fernández & Barreira, 2017; Palomares & Garrote, 2010). Lastly, the great number of tools and software available for the creation of didactic resources, whose use could become a great potential for the development of teaching personnel, cannot be forgotten. The presence of these resources has notably increased in educational contexts, and in publications that specialize in this subject matter (Quirós, 2009; Tucker, 2012; Segovia & Pavón, 2017). As representative examples, the following can be mentioned: Filmora, Audacity, Utellstory or Plotagon, among others.

1.- Description of the experiment

The conducting of this study involved the selection of various groups of students during the 2016/2017 academic year, enrolled in the school subjects "Media Education and Educational Dimension of the ICT" as part of the Early Childhood Education Degree at the University of Cordoba. The research presented here is focused within the area of initial teacher's training, more specifically, on the experience

lived by the future Early Childhood Education teachers as related to the process of learning a set of skills for the editing and production of didactic audio content with the Audacity Software for its posterior inclusion in the Digital Didactic Unit (DDU). This can be defined as “a multimedia didactic resource that fuses the elements found in the traditional Didactic Unit with the benefits and the enrichment that the use of the ICT can contribute with when incorporating a great quantity and types of interactive multimedia activities that respond to the objectives, basic competencies, content and assessment criteria specified within it, and established in the official curriculum of the (learning) stage” (Muñoz, Rubio, Adamuz & Jiménez, p.98). Therefore, the design and the creation of a DDU will demand a careful selection of the content, duration of the sessions, didactic activities that will be performed, as well as through documents and/or programs.

More specifically, in this work we will try to collect the opinions of the students related to the edition and production of audio resources with the Audacity software that will afterwards be integrated into the Digital Didactic Unit mentioned previously.

2.- Objectives

The study will deal with various objectives, which are now described:

1. To describe the opinions of students enrolled in the Early Childhood Education Degree with respect to learning the Audacity program for the edition and production of audio content for their later integration into the Digital Didactic Unit.
2. To analyze the difference in means of the *Questionnaire on the learning of the Audacity Software* and the independent variables: sex, age, and availability of a PC, digital tablet, smartphone and Internet connection.
3. To observe the existence or not of correlations between the two factors from the questionnaire: Assessment of the Audacity software and Learning difficulties.
4. To establish models that could be used to predict the assessment of the Audacity software as a function of the learning difficulties experienced by the students.

3.- Methods

3.1- Sample and Participants

The selection of the sample was conducted by using a non-probabilistic or convenience sampling procedure (Cuenca & Lozano, 2016). As the learning methodology and the questionnaire were applied to the classroom, this selection could only be conducted with the groups of students to whom the teachers in this study taught the class during the 2016-2017 academic year, so that only convenience sampling was possible.

The sample was comprised by 168 students enrolled in the 2nd year of the Early Childhood Education Degree, with an age range between 18 and older than 26 years of age. Thus, more than half of the students (80.4%) were aged between 18-20 years old, with 77% being female and 27% male. Also, 12.5% were aged 21-23 years old, of which 57.1% were female and 42.9% male and 3% were 24-26 years old, of which 80% were female and 20% male. Lastly, 4.2% were older than 26, of which 57% were female and 42.9% male.

3.2- Data collection instrument

The questionnaire used for conducting the study was named *Questionnaire on the learning of the Audacity software in higher education*, composed of 7 items. The validation and reliability of the instrument were measured and corroborated through different statistical analysis. For the validity of the construct, an exploratory factorial analysis (EFA) was conducted, using the Hull method (Lorenzo-Seva, Timmerman, & Kiers, 2011), along with a process of extraction of common factors “robust diagonal weighted least squares (RDWLS)” (Manzano & Zamora, 2009). Its rotation procedure, “weighted Oblimin rotation” (Lorenzo-Seva, 2000), with a Kaiser-Meyer-Olkin (KMO) index of 0.71, a Bartlett’s Sphericity test of $p=0.000$ and an analysis with residuals with a $RMSR = 0.0471$, were considered adequate for the model (Aldas & Uriel, 2017).

On the other hand, the variance had an abnormal distribution, as measured with the Kolmogorov-Smirnov test ($p=0.000$). The result of the extraction of the main components showed the existence of 2 factors, where the total variance explained was 61.13%, thus indicating an appropriate equilibrium between the components of the instrument, which were representative of the theoretical concept.

Table 1. Matrix of rotated components in the exploratory factor analysis.

	Factor 1. Assessment of the Audacity software	Factor 2. Difficulties in the learning
Item1	.609	
Item2	.590	
Item3	.691	
Item4	.598	
Item5		.876
Item6		.734
Item7		.720

In order to contrast and confirm the model extracted through the EFA, a confirmatory factor analysis (CFA) was performed with the statistical program AMOS v23. This analysis allowed us to explain the correlations between a set of observed variables through a reduced set of latent variables or factors (Herrero, 2010). The results obtained from the CFA had adjustment indices that were adequate as a function of the model (NFI= .934; NNFI= .972; CFI= .971; IFI= .972; RMSEA= .065), so that the model was accepted (Schumacker & Lomax, 2004; Browne & Cudeck, 1993; Byrne, 1994; Hu & Bentler, 1998; Stieger, 1990), on the basis of the results from the EFA and its theoretical dimensions considered.

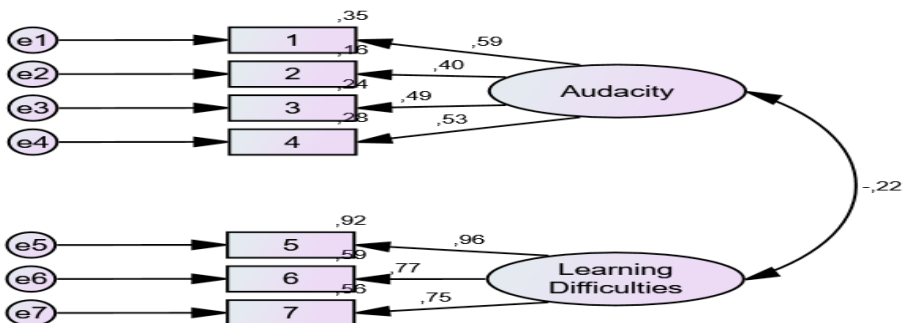


Figure 1. Model created by the 2 factors resulting from the Confirmatory Factor Analysis (CFA).

Also, the reliability of the instrument, was measured with its internal consistency (Merino-Soto, 2016), obtaining a Cronbach's Alpha of 0.78, which shows the acceptable reliability of the items from the questionnaire. Lastly, the matrix of rotated components showed that there were 2 factors that contributed with and explanation of the construct studied: 1. *Assessment of the Audacity software*; ($\alpha = .70$); 2. *Difficulties during the process of learning* ($\alpha = .86$).

Lastly, through the 7 items measured with a Likert scale comprised of 5 possible answers (1=completely disagree to 5= completely agree), the students were asked about their opinion on the process followed in the learning of the Audacity software for the integration of audio resources into the Digital Didactic Unit. Also, they were asked to answer a series of direct questions that alluded to their personal data (sex and age) and availability of technological devices and Internet (PC, digital tablet, smartphone and internet connection).

3.3. Procedure

The instrument was provided to the students when the learning process based on the use of the Audacity software for the edition and production of didactic audio content was concluded, providing them with 5 minutes for its completion. The study researchers were the ones responsible for this, as well as the collecting of the data from the courses.

3.4 Data analysis

The analyses conducted in this study, which were used to provide answers to the study's objectives, were the following:

- In first place, a descriptive analysis of the 7 variables that comprised the questionnaire was performed with the mean and the standard deviation.
- In second place, a descriptive analysis of the 2 dimensions of the questionnaire was conducted, by calculating the frequency distribution, the mean and standard deviation.
- In third place, different analyses of variance were conducted in order to verify if there was any relationship between the dimensions of the questionnaire and the independent variables: sex,

age, and degree, devices and Internet connection. For this, the Mann-Whitney U and Kruskal-Wallis K tests were performed with the statistical package SPSS 23.

- In fourth place, the relationships between the dimensions that comprised the questionnaire were verified through bivariate correlations.
- Lastly, multiple linear regressions were performed in order to predict the assessment of the Audacity software for the creation of Digital Didactic Units as a function of the difficulties experienced during the learning process.

4.- Results

In first place, the descriptive analysis results of the 7 items that comprise the questionnaire used in the present research work are presented. In Table 2, we can observe the means and standard deviations of the items found in the Questionnaire on the learning of the Audacity software in higher education.

Table 2. Distribution of the frequencies of the items found in the Questionnaire on the learning of the Audacity software in higher education

Dimensions	Item	M	SD
Dimension 1: Assessment of the Audacity software	1. The environment of the application is intuitive	3.93	.834
	2. The environment of the application is easy to use	4.08	.836
	3. It eases the recording and edition of audio for its later integration into the DDU	4.36	.540
	4. I've had time in the classroom to master the tool	4.41	.703
Dimension 2: Difficulties experienced during the learning process	5. The learning of the tool required a great effort	3.31	1.00
	6. The learning of the tool created difficulties for me	3.36	.982
	7. The learning of the tool took me a long time	3.25	1.03

Source: Author created.

Next, the results are presented grouped according to the 2 dimensions of the questionnaire. In this sense, descriptive data are shown for each of the dimensions, as well as the existence of statistically significant differences, taking into account the independent variables of the study (sex, age, as well as the availability of devices and Internet connection). Lastly, the existing relationship between the

dimensions that comprise the questionnaire is shown, as well as the establishment of the predictive model of the assessment of the students with respect to the Audacity software, as a function of the difficulties experienced during the learning process.

Assessment of the Audacity software

In this dimension, 4 items were grouped that alluded to the opinions of the students as related to the characteristics of the application's environment, its use, how easy it was to use when editing and producing audio content, and how adequate the time for the mastering it was. In the results observed for this dimension, it was observed that the students had an opinion that was partially in disagreement as for the assessment of the Audacity software ($\mu = 4.19$; $\sigma = .48$).

With respect to the differences that could be found due to the sex of the students, the Mann-Whitney U test for independent variables showed that there were no statistically significant differences due to the student's sex. This was also the case for the availability of devices, as well as the connection to the Internet, in the assessment of the Audacity software.

To determine the influence of age on the assessment of the Audacity software, multiple comparisons of means were performed with the Kruskal-Wallis K test. The results showed that there were no statistically significant differences between age and the student's assessment of the Audacity software program.

Difficulties experienced during the learning process

This dimension was composed by 3 items which gathered the student's opinions related to the difficulties experienced during the learning process, the effort invested in the learning of the program, as well as the time utilized.

The results obtained in this dimension showed that the students were indifferent as respect to the dimension "Difficulties experienced during the process of learning" ($\mu = 3.31$; $\sigma = 0.89$).

On the other hand, the Mann-Whitney U test used to identify the possible differences related to the student's gender and the difficulties experienced during the process of learning showed that there were no statistically significant differences. As for the differences that the availability of devices, as well as the

connection of the Internet established in relation to the difficulties experienced during the learning, the same test showed that just as the previous dimension, that there were no significant differences in either of the cases.

On the other hand, the analysis of variance conducted with the Kruskal-Wallis K test to verify the existence of significant differences between age and the difficulties found between the process of learning of the Audacity software, showed that there were not statistically significant differences in regards to age.

Correlational study

This section will deal with the correlational study between the 2 dimensions of the questionnaire. The data from the application of Pearson’s correlation test, conducted to verify the relationship between the 2 dimensions of the scale, can be found in the following table (see table 3).

Table 3. Results of the bivariate correlations of the dimensions from the learning of the Audacity software in higher education questionnaire.

		Audacity	Difficulties
Audacity	Pearson’s correlation	1	-.164*
	Sig. (2-tailed)		.034
	N	168	168
Difficulties	Pearson’s correlation	-.164*	1
	Sig. (2-tailed)	.034	
	N	168	168
*. The correlation is significant at 0.05 (2-tailed).			

Source: Author created.

As a function of the data obtained, it can be verified that there was a relationship between Dimension 1 (Assessment of the Audacity software) with Dimension 2 (Difficulties experienced during the process of learning) ($R=-.164$ and $p=.034$), given the degree of 2-tailed significance at $ns=0.05$. The relationships between them were low, as shown by Mateo (2004) and Perez, Garcia, Gil & Galan (2009).

Explanatory models of the assessment of the Audacity software in the edition and production of audio contents as a function of the difficulties experienced during the process of learning.

Next, the variable “Assessment of the Audacity Software” will be tried to be explained as a function of the measurements of the dimension “Difficulties experienced during the process of learning”, through multiple regressions (Pardo & Ruiz, 2002), using a step-wise method, in order to observe the predicting variable and its relationship with the criteria variable.

Table 4. Coefficients of the regression line for the dependent variable “Assessment of the Audacity software” as a function of the measurements of the dimension “Difficulties experienced during the process of learning”.

Model	Non-standardized coefficients		Standardized coefficients	t	Sig.	Co-linearity statistics		
	Standard error	Beta				Tolerance	VIF	
1	(Constant)	4.491	.142		31.609	.000		
	Difficulties	-.089	.041	-.164	-2.138	.034	1.000	1.000
a. Dependent variable: Assessment_Audacity								

Source: Author created.

The results obtained, as shown in table 4, allow us to observe that the dimension “Difficulties experienced during the process of learning” was a predicting factor of the dimension “Assessment of the Audacity Software”, as $\beta = -.16$, $t(-27) = -2.13$, $p < .05$. Therefore, it is statistically significant, so that the hypothesis of a linear relationship between the difficulties experienced during the process of learning and the assessment of the Audacity software is accepted. However, the value for R^2 was 0.02, indicating that a low percentage (2%) of the variability of the assessment of this software was explained by the difficulties experienced during the learning of the program.

5.- Discussion and conclusions

The descriptive analysis of the perceptions of the students on learning how to use the Audacity program for the edition and production of audio content, pointed that they perceived the program as being intuitive and comfortable to use, at the same time that it eased the edition and creation of audio content for their later inclusion in the Digital Didactic Units. As for the difficulties experienced during the

process of learning, the students showed an indifferent attitude in regards to the effort, the number of difficulties that appeared during this process, as well as the excessive use of their time for acquiring mastery of the program. In this sense, the data is in agreement with previous studies (Dans & Muñoz, 2016), which pointed to the importance of the perception and assessment that the future teachers have or made on ICT resources, as well as the contributions of the ICT to their future professional practice.

Next, whether or not there were differences in the dimension of the questionnaire in regards to gender, age, and the availability of devices, such as PC, digital tablet or smartphones, as well as an Internet connection was verified. No significant differences were found for the independent variables in both dimensions of the questionnaire. These data have not been contrasted in previous studies, as no studies have been found which studied the differences that could be established due to gender as related to the perceptions of future teachers on the use of the Audacity application. For their part, neither age nor the devices utilized resulted in differences in any of the dimensions studied.

As for the relationship between the dimensions of the questionnaire, a correlation was found for both. Nevertheless, the correlation was low between the difficulties experienced during the process of learning and the student's personal perception of the resource. In research studies conducted in this area, it has been shown that there was a relationship between a positive perception of the ICT and the contribution they provided to learning (Fernandez & Barreira, 2017; Palomares and Garrote, 2010; Roblizo & Cozar, 2015), although their assessment as a function of the difficulties experienced during the process of learning has not been contrasted.

Lastly, the regression analysis indicated that the difficulties experienced in the process of learning on how to use the Audacity software was a predicting factor of the dimension "Assessment of the Audacity software in the creation of audio resources". These data have also not been contrasted in previous studies, as this type of analysis has only just begun to be conducted in studies from the area of Education Sciences.

Ultimately, various research studies (Blanco & Anta, 2016) have shown that the integration of the ICT in the area of education is still under way, because, despite the fact that the education centers count with more technological resources over time, in some cases their use is inadequate, as their function is destined towards routine practices, where the technological aspects are prioritized over the educational ones (Castells, 2002; Perrenoud, 2004). Therefore, the effectiveness and efficiency in the processes of teaching-

learning will depend on the training and abilities possessed by the teachers, which will allow them to interact with the digital resources in the processes of learning, in a more natural manner (Maldonado, 2012). In this sense, it is important that the future teachers become aware about the importance these resources have on the processes of teaching and learning, as they are a magnificent pedagogic innovation which will result in more significant learning of the students (Morales, Ortiz, Trujillo & Raso, 2015). A greater awareness, as well as increased initial and permanent training on ICT of the future teachers can result in a more positive assessment or perception of the contributions to learning of audiovisual resources.

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