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Universities

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Codificación creativa y proyectos interculturales en Educación Superior: Un estudio de caso en tres universidades

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Abstract

This study analyses the concepts, attitudes and practices of 113 students from three major universities in different countries (Japan, Mexico and Spain) related to the process of coding to create multimedia presentations in an intercultural context. A project framed in two research groups has been developed to enhance coding skills in intercultural multimedia presentations. A Student t-test, a mixed questionnaire with a pretest-posttest design, a Wilcoxon test and interviews were administered to students using data triangulation. The results show that fostering intercultural multimedia activities and interaction using coding and communication tools in a university has several advantages regarding ICT skills. Research showed statistically significant efficacy regarding the ability of students to understand the management and use of multimedia content through block programming. Although there are just a few limitations related to Scratch programming language, students highlighted that Scratch is easy to use, funny and perfect for presentations and animations.

Keywords: collaborative learning; evaluation methodologies; ICT framework; design based research; project based learning.

Resumen

El presente estudio analiza conceptos, actitudes y prácticas de113 alumnos de tres importantes universidades de diferentes países (Japón, México y España) en relación al proceso de codificación para crear presentaciones multimedia en un contexto intercultural. El proyecto está enmarcado en dos grupos de investigación, y ha sido desarrollado para mejorar habilidades de codificación en presentaciones multimedia interculturales. Se aplica

una prueba t de Student, un cuestionario mixto con un diseño pretest-postest, una prueba de Wilcoxon y entrevistas a los alumnos, haciendo uso de triangulación de datos. Los resultados muestran que el fomento de actividades multimedia y la interacción intercultural utilizando herramientas de codificación y la comunicación en una universidad tiene varias ventajas con respecto a las competencias TIC. La investigación demostró estadísticamente una eficacia significativa en cuanto a la capacidad de los estudiantes para comprender el manejo y uso de contenidos multimedia a través de programación por bloques. Aunque hay alguna limitación relacionada con el lenguaje de programación Scratch, los estudiantes destacaron que Scratch es fácil de usar, divertido y perfecto para presentaciones y animaciones.

Palabras clave: aprendizaje basado en proyectos; aprendizaje colaborativo; investigación basada en el diseño; metodologías de evaluación; TIC.

The application of educational technology in universities is providing various possibilities that affect interactions in teaching and learning processes. The tools of synchronous and asynchronous communication (Anastasiades, Filippousis, Karvunis, Siakas, Tomazinakis, Giza & Mastoraki, 2010) together with the possibilities of multimedia content open a range of possibilities in educational contexts.

Using information provided from taxonomies (Näsström, 2009), practice is designed to harnesses the potential to understand and create with the Scratch application, which facilitates the work with codes and programs (scripts) to create multimedia content (Brennan & Resnick, 2012; Maloney, Resnick, Rusk, Silverman & Eastmong, 2010; Sáez-López, Román-González & Vázquez-Cano, 2016) with an active student-centred approach.

From an intercultural perspective, it is important to enable interactions between students from different universities and nationalities through virtual learning environments, Interactive Videoconferencing (Ertl, Fischer & Mandl, 2006; Gerstein, 2000; Knipe & Lee, 2002) and other communication tools (Edmodo, Voice Thread and Skype) that enable enrichment and interaction in the process to create and share content (Sáez, Leo & Miyata2013).

The research process focused on the application of a Design Based Research strategy (Anderson & Shattuck, 2012; Barab & Squire, 2004; Dede, Ketelhut, Whitehouse, Breit & McCloskey, 2009) that allows an intervention from complementary methods, which contribute to understanding interactions in learning processes. This approach allows for the analysis of innovative practices among several universities from the application in a real context with multiple interactions framed in an active and innovative instructional design in the field of university teaching.

The present study was developed in three benchmark universities in their respective countries: Chukyo University (Japan), Spanish National University of Distance Education-UNED (Spain) and Cuauhtémoc University (Mexico). Proposed pedagogical framework and intervention in the research process is the outcome of the experience acquired from two research groups: Professional Training,

Educational & Intercultural Innovation and Media Design (http://portal.uned.es/portal/page?_pageid=93,19652410&_dad=portal&_schema=PORTAL) and World Museum Project (http://sns.hiroba.sist.chukyo-u.ac.jp/).

THEORETICAL FRAMEWORK

Educational processes have been strengthened in recent decades from scientific knowledge in pedagogy across different models and methodological approaches in educational research. There is a tendency in the last decade to present Design Based Research (DBR).

DBR is being utilized increasingly in educational contexts (Anderson & Shattuck, 2012, 24). Moreover, after the intervention applied using this approach, educational practice and research processes are improved. DBR offers a 'best practice' stance that has proved useful in complex learning environments, where formative evaluation plays a significant role (Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009, p. 6).

DBR is proposed as a strategy to innovate in educational contexts, and allows for a systematic strategy focused on learning. It is a naturalistic approach to understanding the processes of learning through informed exploration, enactment, evaluation within a local context and development of design principles (Anderson, 2005). This approach improves the impact in educational interventions.

DBR is a methodology designed by and for educators that seeks to increase the impact, transfer, and translation of education research into improved practice (Anderson & Shattuck, 2012, 16). This approach provides a strategy to evaluate and innovate methodology and a pragmatic approach, improving educational processes generating knowledge (Anderson & Shattuck, 2012, p. 17).

Therefore, the importance of practice in educational contexts with constant interaction among participants from a collaborative perspective is highlighted. Multiple methods and interactions constitute basic elements in this approach (Maxcy, 2003).

It is important that DBR has an influence and impact on real educative practices to justify the value of theoretical approaches. Some authors (Barab & Squire, 2004; Reeves, 2000) emphasise the critical importance of the real impact of educational research in teaching practice. In short, DBR application has advantages regarding integration between theory and practice with an active intervention aimed to understand educational processes.

Pedagogical design, framework and principles

The applied pedagogical model is based on the pedagogical implementation of cross-curricular approaches through the contemporary learning and inter-

disciplinary approaches. The application of principles of instruction (Gagne, Briggs & Wager, 1992) is elemental in this process in order to gain the attention of the students, inform them of the objectives, stimulate recall of prior learning, present the content, provide learning guidance, elicit performance (practice), provide feedback, assess performance, enhance retention and transfer skills to the job.

Significant learning and prior learning is important from the perspective of other classic authors taken into account in this pedagogical design and collaborative learning through critical thinking and discovery learning (Ausubel, 1978; Bruner, 1966). Social interactions in learning environments from the perspective of socio-cultural and constructivism theories (Vygotsky, 1978) are essential. Other important elements are related to interactions in social and cultural contexts in educational activities, situated learning (Brown, Collins & Duguid, 1989; Wenger & Snyder, 2000) and active participation in learning communities and groups with an intercultural component, in this case.

Moreover, Project Based Learning (PBL) (Jonassen, 1977) is a constructivist approach in educational activities aimed at solving problems in real contexts with opportunities for inquiry-based learning (discovery) in order to ensure that learning occurs when the subject investigates, discovers and solves problems actively.

There is a connection of the proposed activities with the interests of college students and the possibility of exploring, discovering and creating. All this fits perfectly with the proposed approach focused on PBL, improving the development of student's autonomy and self-initiated action on learning activities, problem solving, knowledge acquisition and decisions making.

Use of synchronous and asynchronous communication tools (Skype, Thread, Google apps, Scratch, Edmodo, etc.) demands a framework regarding distance education. The proposed pedagogical design takes into account the American distance education consortium principles (ADEC Guiding Principles for Distance Learning, 1999) for distance teaching and learning. Therefore, the activities are part of the structure provided by these principles, sorting and detailing items and practices carried out in the developed process of learning through an active student-centred approach.

From a scaffolding process and application of Vygotskian constructivism (Vygotsky, 1978), any cognitive task has a considerable number of processes; trying to categorise the cognitive processes can undermine the distinctive holistic approach to the learning process.

ICT in educational processes: Coding, projects, interactions and learning environments

Creative incorporation of technology in an educational framework and the use of ICT under pedagogical conditions improve interactive learning environments centred on the students.

The integration of the Scratch application presents a visual language that is free and easy to use and is favourable to a learning method based on projects with a role focused on students' activity. This tool enables active and constructive learning; in fact, it is not difficult to imagine a situation of reproductive learning using this application (López-Escribano & Sánchez-Montoya, 2012).

"Digital fluency requires not just the ability to chat, browse, and interact but also the ability to design, create, and invent with new media" (Resnick, Maloney, Hernández, Rusk, Eastmond, Brennan, Millner, Rosenbaum, Silver, Silverman & Kafai, 2009, p. 60). Scratch is based on the ideas of the constructivist learning logo (Papert, 1980). This versatile application can be used to create projects containing media scripts. Images and sounds can be imported or created in Scratch using a built-in paint tool and sound recorder (Maloney et al., 2010).

Teachers and students have the perception that programming is very complicated due to the high level of abstraction of the concepts in order to program. The creators of Scratch (Resnick et al., 2009) believe that it is able to encompass different types of projects in different contexts through a fun, meaningful and social programming language. Papert (1980) argued that programming languages should have a "low floor" (easy to get started) and a "high ceiling" (complex projects).

The Scratch programming environment and language work together to create a system that is exceptionally quick to learn—users can be programming within fifteen minutes—yet with enough depth and variety to keep users engaged for years (Maloney et al., 2010, p. 14).

Moreover, it is important to value multiple ways of knowing: The learner has to be able to put concepts to use in their projects and understand other student's work. Assessments should explore these multiple ways of knowing. "The intersection of computational thinking concepts and computational thinking practices leads to multiple ways of knowing" (Brennan & Resnick, 2012, p. 23).

Through Scratch, it is intended that students will be able to use programming concepts through a visual and intuitive language, because the management is performed by placing blocks of different colours and commands, which result in a product. "The Scratch programming system strives to help users build intuitions about computer programming as they create projects that engage their interests" (Maloney et al., 2010, p. 14).

The ability to interact with applications such as Voice Thread and Edmodo to share content and work collaboratively allows the development of intercultural activities with content and a continuous enrichment in interactions between students who show interest in others (Miyata, Ueshiba & Harada, 2012; Sáez, Leo & Miyata, 2013).

The interactions and learning experiences are enriched through the use of the Interactive Video Conference, which pinpoints the design of interactive activities in conjunction with well-organised, student-centred instruction; this is the key factor to an effective Video Conference (Omatsey, 1999; Stewart & Vallance, 2008).

AIMS OF THE STUDY

The main objective of the study is to analyse interactions, attitudes and practices of college students from several countries who participate in dynamic, multimedia and intercultural activities. The specific objectives are:

- To assess the attitudes of college students from several universities regarding interactions in intercultural activities using technologies.
- To analyse creation of multimedia content, interactions and communication in intercultural activities.
- To check possibilities concerning multimedia in intercultural activities.
- To analyse acquisition of basic programming concepts in intercultural activities by college students.

Method

Intervention design is a key feature of the quality and results of research projects. Mingfong, Yam San, and Ek Ming (2010) identified four design characteristics that must be aligned to create interventions: Frameworks for learning, affordances of the chosen instructional tools, domain knowledge presentation and contextual limitations.

It is important to document creation and implementation during intervention so readers of the research can judge for themselves the possibility of achieving equivalent results from the use of interventions in their own contexts.

The evaluation was based on a naturalistic evaluation model approach, which is conducted with the collaboration of the participant students and teachers (Guba & Lincoln, 1981). Evaluation focuses on several moments of assessment: Ex-ante evaluation, ongoing evaluation and ex-post evaluation (Owen & Rogers, 1999). The suggested evaluation is an applied synchronised field survey, which combines qualitative and quantitative evaluation methods.

Scratch, Voice Thread, Edmodo and Skype allow interactions with possibilities of creating multimedia and communication through collaborative work between students from different universities (Ertl, Fischer & Mandl, 2006; Knipe & Lee, 2002; Sáez, Leo & Miyata, 2013).

These activities are described through a site that translates interactions, synchronous communication and creation of multimedia activities through programming them into different languages (Spanish and English) (Figure 1).

Figure 1. Scratch projects
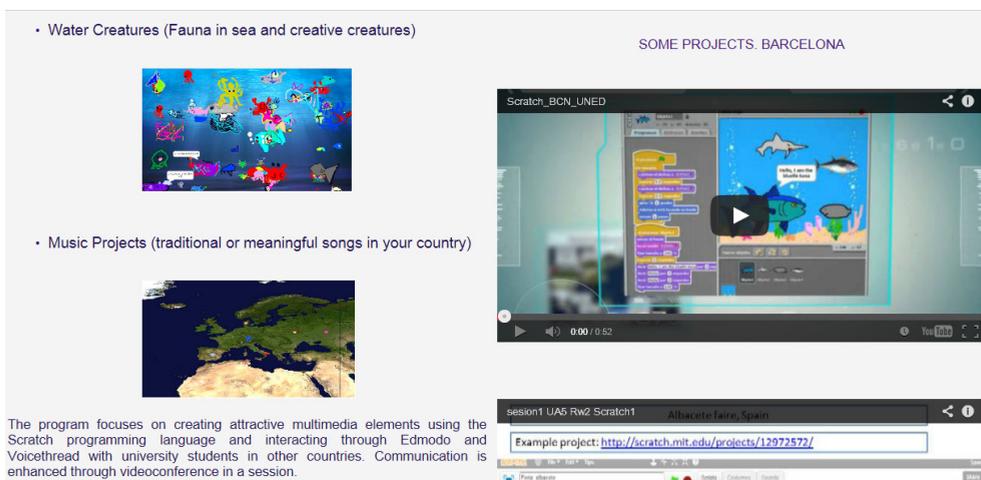
Source: https://sites.google.com/site/scratchprojectsepals/

Participants

The study sample consisted of 113 university students belonging to three different universities: Chukyo University in Japan, Cuauhtémoc University (Aguascalientes) in México and the Spanish National University of Distance Education (UNED), with students from the EUROMIME program (from several countries in the world). There were 67 women and 45 men in the sample. The contingency analysis (Chi square) is not detailed because there are no significant differences regarding gender or college.

Figure 2. Nationality of students. Sample in three universities
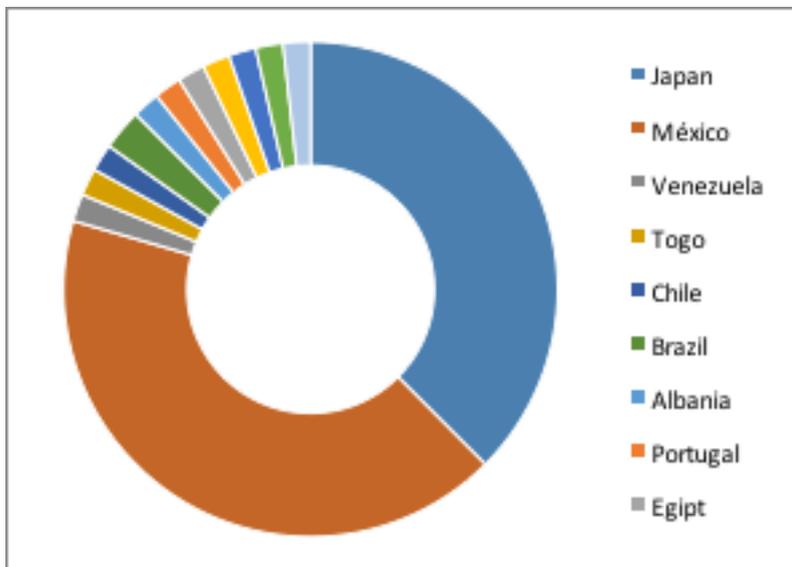
Procedure and instruments

Though the DBR approach, we apply research mixed methods using a variety of tools and techniques in the intervention consistent with the research design. "It is perfectly logical for researchers to select and use differing methods, selecting them as they see the need, applying their findings to a reality that is both plural and unknown" (Maxcy, 2003, p. 59).

Moreover, in this study, there are a large number of interactions between students and teachers with several options and communication tools; thus, the ideal research approach is through a DBR due to it involving multiple collaborative iterations (Anderson & Shattuck, 2012).

The present study proposes three dimensions that address the research objectives through a quasi-experimental method. Perceptions and practices reported by students were analysed utilising this method. This kind of research is intended to describe the individual experience in particular environments (Creswell, 2003). The study analyses information related to intercultural activities by college students from several countries using several communication tools. Intervention is framed in the mentioned research groups: Professional Training, Educational Intercultural Innovation and Media Design (Group 125 at UNED) and World Museum Project.

The intervention comprehends six-month programmed activities during which students engaged in activities and case studies, and attended sessions and seminars

related to presentations, multimedia and intercultural content. Students created their own material based on the project goals applying methodological strategies described in the theoretical framework. Multimedia, coding and communications enabled several possibilities analysed in this research. One test (Dimension 1), a mixed questionnaire (Dimension 2) and interviews (Dimension 3) were the main instruments.

Once the information was gathered, we applied a Student t-test in Dimension 1, and a Wilcoxon test in Dimension 2 to measure attitudes before and after the training program and an analysis of interviews in Dimension 3.

Data triangulation ensures that there is evidence to support the validity of results and minimise error variance (Goetz & Le Compte, 1988). The data triangulation of Cohen, Manion and Morrison (2000) was implemented using quantitative information collected in tests, questionnaire and interviews.

Table 1. Research dimensions, indicators and instruments

| DIMENSIONS	INDICATORS	DATA AND INSTRUMENTS
Dimension 1: Coding and creation of multimedia content	Creation of presentations coding with Scratch	Questionnaire Student t-test Wilcoxon test Pretest-posttest Interviews
	Management of dynamic content using codes	
	Acquisition of basic programming concepts in intercultural activities	
	Use of basic programming concepts to create content	
	Knowledge regarding possibilities of animations and multimedia	
Dimension 2: Use of multimedia and communication tools in intercultural activities	Communication resources	
	Creation of multimedia content	
	Use of audio and video asynchronous tools	
	Interactions in intercultural activities	
	Collaborative projects using coding "remixing"	

DIMENSIONS	INDICATORS	DATA AND INSTRUMENTS
Dimension 3: Attitudes using coding and communication tools in intercultural activities	Opinions regarding communication tool in educational activities	
	Attitudes related to basic concepts in coding	
	Advantages concerning multimedia in intercultural activities	
	Analysis of interactions using technologies	
	Opinions regarding activities using coding and animations	

ANALYSIS OF THE RESULTS

Dimension 1: Coding and creation of multimedia contents. Student t-test with paired samples test

In Dimension 1, we have applied a test Scratch College Beginner Test (SCBT) with a pretest and posttest design, which allowed us to ascertain whether there were significant improvements before and after the implementation of the project. Normality is assumed due to sample size and the Kolmogorov-Smirnov test. The significance level is 0.01 ($\alpha = 0.01$).

Figure 3. Examples, Scratch college beginner test (SCBT)
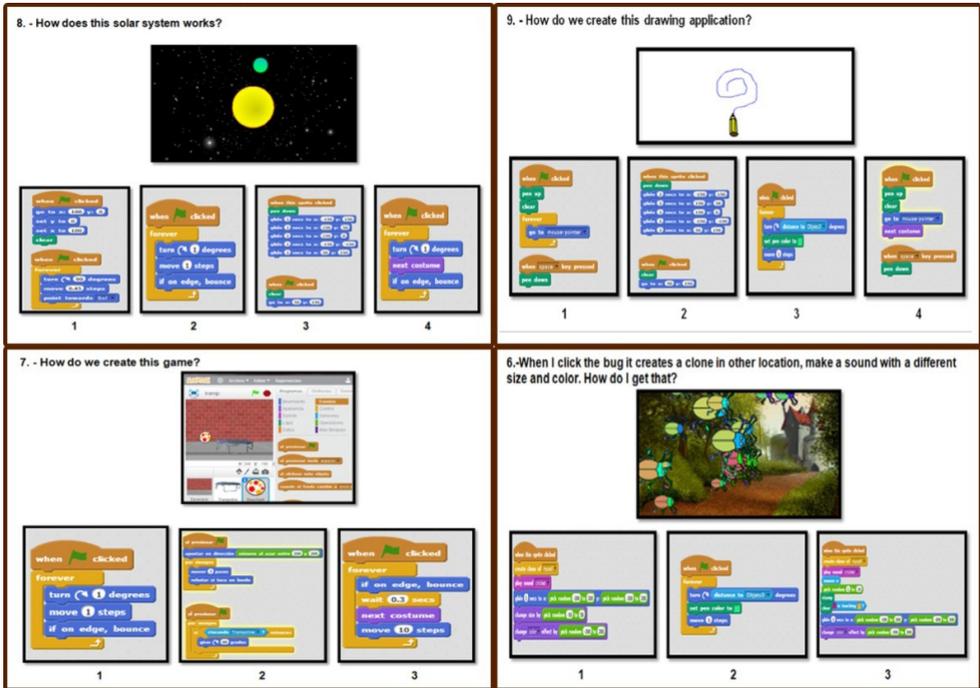
From the results of the Student's t-test administered, it can be stated that there are significant improvements in the results of the administered test, so the program implemented improves the ability of students to understand the management of multimedia contents programming with Scratch.

Table 2. Paired samples test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	99% Confidence Interval of the Difference				
					Upper	Lower			
Pair	PRE T. (SCBT) – POST T. (SCBT)	-1,522	1,838	.173	-1,975	-1,069	-8,805	112	.000

Dimension 2: Use of multimedia and communication tools in intercultural activities. Descriptive analysis and Wilcoxon test

In this dimension, a descriptive analysis and Wilcoxon test are detailed in order to give relevant information in the educational process. Regarding descriptive analysis, detailed percentages provide valuable information to consider. It is also important to analyse the value of the Wilcoxon test, which is based on the data provided by the pretest-posttest questionnaire regarding attitudes and opinions related to the use of communication and multimedia resources in project implementation. The significance level is 0.01 ($\alpha = 0.01$).

Table 3. Dimension 2.1: Use of multimedia and communication tools in intercultural activities.
Tools for intercultural projects

Dimension 2.1: Use of multimedia and communication tools in intercultural activities. Tools for intercultural projects.	% Post test				Wilc. test. 0.01
	1	2	3	4	
2.1.1.-Voice Thread application	10.6	20.4	46.9	22.1	0.000
2.1.2.- Edmodofor communication	23.9	23.0	31.9	21.2	0.591
2.1.3.- Scratch to create content	1.8	19.5	33.6	45.1	0.000
2.1.4.- Synchronous communication with Skype	8.8	23.0	41.6	26.5	0.000
2.1.5.- Google Sites to organize	10.6	25.7	38.9	24.8	0.017
2.1.6.- Any multimedia content with Scratch	19.5	26.5	31.9	22.1	0.001
2.1.7.- Scratch is easy to use	15.0	19.5	52.2	13.3	0.002
2.1.8.- Scratch is useful	8.0	15.0	46.0	31.0	0.000
2.1.9.- Animations with Scratch	2.7	23.0	43.4	31.0	0.000
2.1.10.- Scratch enables interactive presentations	4.4	21.2	45.1	29.2	0.000
/ / 1 = Strongly Disagree / / 2 = Disagree / / 3 = Agree / / 4 = Strongly Agree / /					

Reliability was quantified by measuring internal consistency using Cronbach's alpha coefficient (Cronbach, 1951). In Dimension 2.1 (Use of multimedia and communication tools in intercultural activities, Tools for intercultural projects), the
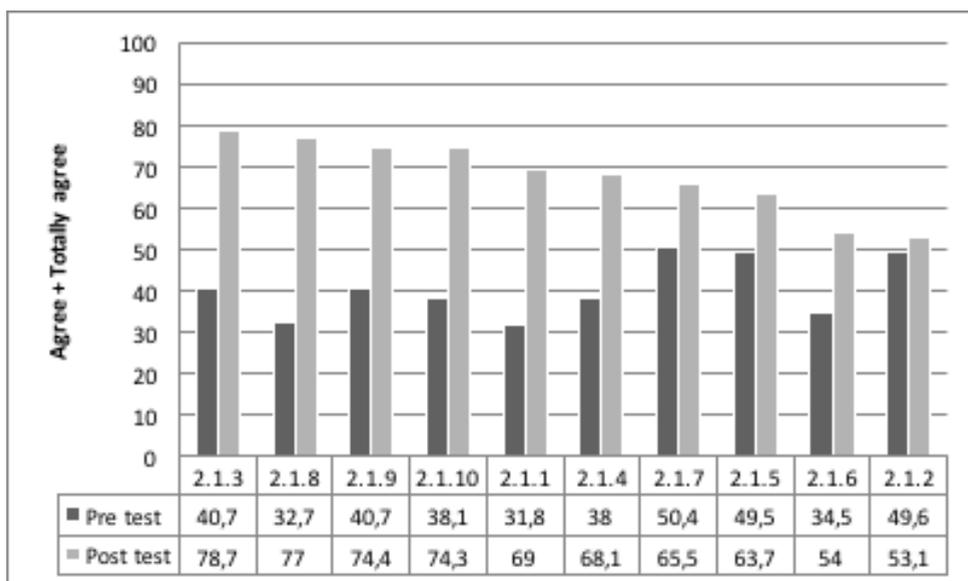
ex-ante questionnaire has an accepted reliability with a Cronbach's alpha of 0.76, and the ex-post questionnaire also has an acceptable reliability with a Cronbach's alpha of 0.871.

Therefore, this Dimension refers to opinions and attitudes about multimedia content, communication resources and interactions in collaborative projects using coding. It highlights that around 80% of students have a positive attitude towards the use of Scratch (Items 2.1.3, 2.1.8, 2.1.9, 2.1.10), and over 65% have positive attitudes regarding communications tools like Voice Thread or Skype (Items 2.1.1, 2.1.4).

Around 60% of the sample considers Google Sites a good resource (Items 2.1.5), and they think that Scratch is easy to use (Item 2.1.7). Around half of the sample thinks that Edmodo is a good tool (Items 2.1.2) and that you can use any multimedia content with Scratch (2.1.6).

In addition, the analysis of the values in the Wilcoxon test shows that the educational program has led to a significant increase in students' attitudes regarding use of Scratch to create contents (Items 2.1.3, 2.1.6, 2.1.7, 2.1.8, 2.1.9, 2.1.10), and there were significant improvements regarding the use of Voice Thread and Skype (Items 2.1.1, 2.1.4) as communications tools (Table 3, Figure 4).

Figure 4. Dimension 2.1: Use of multimedia and communication tools in intercultural activities. Tools for intercultural projects

	2.1.3	2.1.8	2.1.9	2.1.10	2.1.1	2.1.4	2.1.7	2.1.5	2.1.6	2.1.2
Pre test	40,7	32,7	40,7	38,1	31,8	38	50,4	49,5	34,5	49,6
Post test	78,7	77	74,4	74,3	69	68,1	65,5	63,7	54	53,1

Moreover, in Dimension 2.2: Use of multimedia and communication tools in intercultural activities. Use of Scratch to create content in educational settings, the

data analysed in table 4 shows that over 80% of students manage Scratch to move sprites, backgrounds and make sound and text in interactive projects (Items 2.2.1, 2.2.2, 2.2.3, 2.2.4). They also highlight that Scratch is an intuitive program. Over 60% are able to create interactive projects in which users have to click or respond (Item 2.2.5).

Between 40% and 50% of the sample are able to work with hardware, operators and create games (Items 2.2.6, 2.2.7, 2.2.8).

Table 4. Dimension 2.2: Use of multimedia and communication tools in intercultural activities. Use of Scratch to create content in educational activities
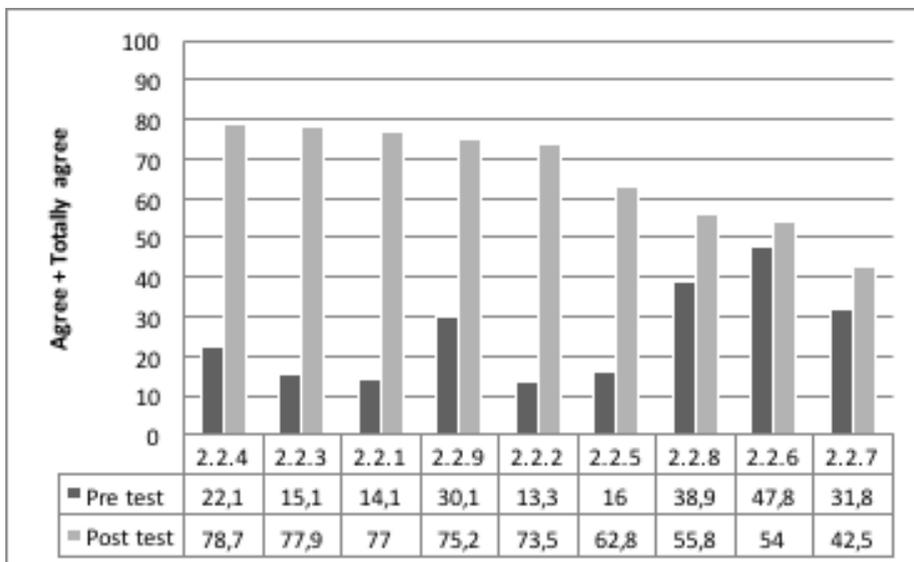
Dimension 2.2: Use of multimedia and communication tools in intercultural activities. Use of Scratch to create content in educational settings.	% Post test				Wilc. test 0.01
	1	2	3	4	
2.2.1.- Move and animate sprites	17.7	5.3	55.8	21.2	0.000
2.2.2.- Include sound	19.5	7.1	42.5	31.0	0.000
2.2.3.- Create text messages	16.8	5.3	39.8	38.1	0.000
2.2.4.- Change the background	13.3	8.0	44.2	34.5	0.000
2.2.5.- Create interactive projects	16.8	20.4	32.7	30.1	0.000
2.2.6. - Create basic games	17.7	28.3	43.4	10.6	0.189
2.2.7.- Control connected hardware	38.9	18.6	36.3	6.2	0.109
2.2.8.- Manage operators	28.3	15.9	31.9	23.9	0.191
2.2.9.- Intuitive programming language	8.8	15.9	46.9	28.3	0.000
/ / 1 = Strongly Disagree / / 2 = Disagree / / 3 = Agree / / 4 = Strongly Agree / /					

Reliability was quantified by measuring internal consistency using Cronbach's alpha coefficient (Cronbach, 1951). In Dimension 2.2 (Use of multimedia and communication tools in intercultural activities. Use of Scratch to create content in educational activities), the ex-ante questionnaire has an accepted reliability with a Cronbach's alpha of 0.74 and the ex-post questionnaire also has an accepted reliability with a Cronbach's alpha of 0.883.

The Wilcoxon test shows significant improvement in basic use of Scratch: Movement, sound, text messages, presentations and intuitive and interactive projects (Items 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.9). Thus, the program applied has improved basic concepts regarding coding with these contents. Regarding operators, gaming and use of operators, results have not showed significant improvements (Items 2.2.6, 2.2.7, 2.2.8).

Figure 5. Dimension 2.2: Use of multimedia and communication tools in intercultural activities. Use of Scratch to create content in educational activities

	2.2.4	2.2.3	2.2.1	2.2.9	2.2.2	2.2.5	2.2.8	2.2.6	2.2.7
■ Pre test	22,1	15,1	14,1	30,1	13,3	16	38,9	47,8	31,8
▢ Post test	78,7	77,9	77	75,2	73,5	62,8	55,8	54	42,5

Dimension 3: Attitudes using coding and communication tools in intercultural activities. Interviews

From the information collected in interviews, which improves data triangulation in this research, students gave interesting and essential information with details of their particular perspectives. This resulted in a number of responses of interest analysed using Hyper Research v. 1.2.6 software. The students in the sample responded by openly providing diverse opinions to questions related to the use of coding and communication tools in intercultural projects.

Figure 6. Main frequencies of interviews
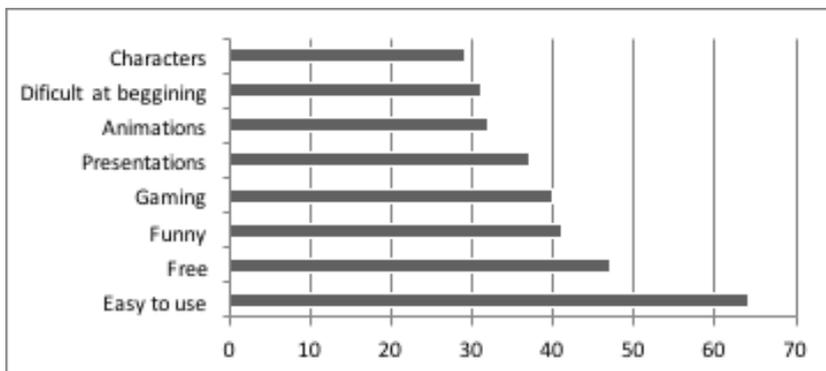
The most frequent responses suggest that students find several advantages related to the use of coding and scratch in multimedia projects. Scratch is available, easy to use and allows for the creation of animations, gaming and presentations (Figure 6).

Moreover, students tend to use motion blocks (101 frequencies), looks (45), control (43), sound (43), sensing (36) and events. Some frequencies describe disadvantages related to language support in Scratch; "[…] there are times when you are not in the native language support" (98KA).

Most students (89) acknowledged the importance of using multimedia, animated and interactive content in intercultural projects. Other options that could be useful for intercultural projects are Wikis (11), Power Points (12), Google apps (14), Skype (16) and social media (e.g., Twitter (19) and Facebook (47)).

In short, most students gave positive opinions related to the advantages of creating content with Scratch, which is intuitive and easy to use. "Very easy to handle combined with the possibility to make a program without worrying about syntax […] (17SK)".

CONCLUSIONS

Consistent with the objectives of the study and obtained information from the various tests, instruments and data triangulation, research processes show the following conclusions:

• The project implemented has significantly improved efficacy regarding the ability of students to understand and use multimedia content through block programming (SCBT, table 2, Dimension 1, Items 2.1.3, 2.1.6), and enabling improvement in presentations and multimedia content (2.1.7, 2.1.8, 2.1.9, 2.1.10).

- The application of the present project allowed students to create sprites, backgrounds, text and sound in interactive presentations (over 75% of students) with statistical improvement (Items 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5).

Data shows (tests, questionnaire and interviews) positive attitudes of students regarding multimedia presentations using technologies in intercultural activities. Students have a favourable attitude towards the use of Scratch and other communications such as Voice Thread or Skype (Dimensions 2 and 3).

After the implementation of this project, students know how to work with sprites, background, sounds, text and interactions. Nevertheless, in order to enhance implementation in the future, we have to take into account that gaming, operators and connected hardware have not improved statistically in this process.

Although there are just a few limitations related to Scratch programming language, students highlighted that Scratch is intuitive (item 2.2.9), available, easy to use, funny and perfect for presentations and animations (Dimension 3, interviews).

In short, fostering intercultural multimedia activities and interaction using coding and communication tools in a university setting has several advantages regarding ICT skills and content creation. The implemented project aimed at helping students manage dynamic and interesting presentations to share with other students and cultures. Students noted positive attitudes related to intercultural activities using multimedia, coding and communication resources. The implemented project provided necessary training and skills in order to create interactive and attractive content using basic coding.

The positive feedback from students about the concept of coding to create multimedia presentations in intercultural contexts should be kept in mind Students have positive attitudes and clear ideas, and now, they simply need to be implemented in the future.

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