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Assessing Segurikaschool: an Injury Prevention Multimedia Tool for Schools

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Abstract

Segurikaschool is a multimedia injury prevention tool that aims to create a systematic educational resource to be used in schools. The research objective is to assess the characteristics of Segurikaschool and find where it needs improvement. The research follows these phases: a focus group of experts; a content analysis for group interview; a survey design and validation aimed at experts and key stakeholders in the health, injury prevention and safety promotion fields. This multimedia tool shows strengths in promoting safety and preventing injuries in school environments. Some formatting and aspects of the interface need improvements.

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Keywords: Primary Education; prevention; school accidents; injuries; educational tools;

1. Introduction

Accidents that cause injury are one of the most important issues in the public health arena today. We define accident as an unexpected event, that ends in an injury or a complex syndrome (trauma, fracture, poisoning, burn, etc.) that requires immediate medical assistance Children's accidents in developed countries cause 40% of total casualties between the ages of 4 and 14 (Soriano, Serrano, Rus, Roncero, Ruíz y Cabrera, 2008). According to UNICEF (2001), over 20.000 children in this age bracket die every year, moreover in the richest countries, due to accidents.

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The accidents' are caused in many ways. However, a big portion of them are usually a consequence of an external agent such as faulty emergency planning, faulty safety materials, objects, or the usage and consumption of goods. There are also accidents caused by a lack of skills, immaturity, insufficient knowledge and impulsiveness. Thus, most accidents are caused by human error (Azeredo and Stephens-Stidham, 2003; Khambalia, Joshi, Brussoni, Raina, Morrongiello, and Macarthur, 2006; Unni, Locklair, Morrow and Estrada, 2012).

15% of children's accidents happen at school. Children spend a great deal of their time in school and often carry out activities, such as games and sports, which imply added risks (MacKay and Vincenten, 2012). Therefore, school is an ideal location for addressing health and safety education. Schools naturally take on a strong role in helping to prevent child accidents and teaching staff could incorporate messages on school safety through their behavior and work in class (Gavidia, 2001).

A previous stage in this research has allowed for collaboration on a first version of the multimedia tool SEGURIKASCHOOL, along with the creation of a didactic guide that helps to evaluate and use the tool tfor accident prevention in Navarre's School System. (Gabari y Pollán 2009). The didactic guide proposes to integrate the accident prevention education into five types of curricula in the schools of Navarre: Spanish and Spanish Literature; Social Science; Natural Science; Art; and English as Second Language. It hopes to be a tool for transversal and systematic work on health education that contributes to an improvement in school safety and culture. The provided contents refer to those places around the school where there are a greater number of children's accidents. It also takes into account daily routines and students' habits that could be the cause of accidents. Figure 1 represents an example school, called Segurikaschool for clarity purposes, as a safe school environment.

Figure 1. Entrance at SEGURIKASCHOOL School

The activities proposed in the tool are varied, yet complement each other to provide a well-rounded learning experience. Generally speaking, the activities are to be read and refelected upon by the students, working on their concentration and attention. Comprehension activities include; multiple choice question and answer; image and concept dragging to connect with statements; coding and decoding math symbols; solving arithmetic operations of adding, subtracting, multiplying and long division (typical complexity is at a 3rd and 4th grade level in primary school); letter ordering to create words; select the correct menu option.

DeSeCo key competencies are developed (Rychen y Salganik, 2006):

1. Knowledge and interaction with the physical environment
2. Autonomy and personal initiative
3. Information treatment and digital competence

The characters that guide the tool's activities incorporate diversity; moving away from stereotypes and leaving the possibility open to create a new story within each class that uses the tool. Students make choices that effect the characters' relationships, opportunities, limitations, etc.

The tool is directed at students in the second cycle of the Primary education (8-9 year old). It comes in 5 linguistic models: G (Education entirely in Spanish), A (Education in Spanish with one Basque class), B (Education in Basque with some subjects in Spanish), D (Education in Basque with one Spanish class), TIL

[integrated language process] (PAI at the moment: Education in Spanish with subjects in English as working language, CLIL methodology).

Figure 2 Characters and calendar.

Over the course of the nine month school year, 36 activities are introduced: 32 activities (16 in Spanish and 16 in Basque) in the academic fields Spanish and Spanish Literature, Social and Natural Science, Maths, and Artistic Education. 4 activities are in English, which is common for Spanish and Basque students. Figure 2 shows the calendar and characters that guide the presentation.

In this first stage of the assessment process, a questionnaire was designed to gather information and opinions from the initial users on which sections are valuable and which need changing.

2. Research Objectives

The general objective is to assess the technical, pedagogical, and ergonomically fundamental characteristics of a digital educational resource that has been designed to help prevent school accidents through its integration into the regular primary school curricula.

The specific objectives attempt to:

- Evaluate the resource from a multidisciplinary perspective.
- Detect aspects to improve in the proposed tool.

3. Methodology

3.1, Participants

3.1.1, Focus Group of Experts

Six experts, in the following disciplines, participated in the focus group (Krueger, 1991: 24): Education, Health, Technology, Computer, Psychology and Sociology. Their professional profiles are: Health and Safety Specialist, Professor, Child Psychologist, Health Promotion Specialist, and Kindergarten and primary school teachers. Judgment sampling was used. A focus group leader conducted the meeting.

3.1.2, Specialist Sample :

The population of two groups of experts was invited to participate:

- SHE network: specialist population, n=41.
- University Faculty: population that works promoting health and safety in schools, n=47.

The accepting sample was made up of 36 participants. All of them have the same field of action in common: country wide promotion of health and accident prevention. After our first contact through e-mail, the digital resource and didactic guide were sent to them.

3.2, Procedure

3.2.1, Focus Group

The experts were invited to participate by sending a project introduction e-mail, then the multimedia tool and the didactic guide. After a period of individual testing, for three weeks, in which the experts became familiar with and used the tool, the focus group was held. The meeting was carried out and recorded at the Public University of Navarre during March of 2013. The meeting lasted 90 minutes. After the content analysis, core ideas were delved into in order to create the evaluating questionnaire for the tool and focused on: suitability, context of usage, interactive capacity, accessibility, characters, adaptability, iconography, color, etc.

3.2.2, Questionnaire Design

The format is a Likert scale with five options, 1 being the lowest score (strongly disagree) and 5 the highest (strongly agree). The questionnaire is broken into three parts: nine items referring to the tools' characteristics; four items that ask about the curricula integration; and seven items that evaluate the teacher's role in promoting health at school. At the end of the questionnaire some open-ended questions related to the advantages, disadvantages, and aspects to improve are added. The results of these last questions will be targeted in future publications.

3.2.3, Questionnaire completion

The Google Drive application allows for the completion and data download of subsequent analysis in Excel and SPSS formats. The initial sample group size invited consisted of 88 individuals, and the final accepting sample consisted of 36 individuals. The time that passed between receiving the materials and obtaining the replies was two months, April-June 2013.

4. Results

The accepting simple, n=36, filled in the questionnaire in its entirety. The present study includes the result analysis collected from the first part of the questionnaire.

Table 1. Digital Tool Characteristics

Item Number	$\bar{x}$	S
1. Information	4.44	0.92
2. Application usability	4.22	1.00
3. Instructions comprehensiveness	4.05	1.05
4. Iconographic and color	3.72	1.27
5. Script	4.16	0.92
6. Activity valuation	4.17	1.01
7. Character identification and diversity	3.76	1.14
8. Resource interactivity	3.70	0.98
9. Accessibility	3.77	0.80

Table 1 shows the individual differences related to one specific characteristic evaluated. Most unfavorable stances award the lowest scores to interactivity, iconographic and color, character identification and diversity. Most favorable stances award the highest scores to information, application usability activity valuation The standard deviations show little dispersion in the answers (0.80 – 1.27) and the average score in all cases exceeds the central value 3, in an answer scale of 5 alternatives (1-5).

4.1, Validity and Reliability

Principal component analysis is used, and it is chosen to disregard correlation values lower than 0.5 Reliability statistical analysis is performed using Cronbach's alpha coefficient. Table 2 shows the result.

Table 2. Validity and Reliability

Validity	0.8585
Reliability	0.84

Given that the alpha coefficient is higher than 0.70 it can be stated that the questionnaire appears to have acceptable reliability. Therefore, the degree of precision that the measurement obtained through the survey can be accepted. It is expected that the questionnaire's total scores present a positive correlation with the evaluated resource. The hypothesis validation refers to the relationship between two quantitative variables, thus the verification has been estimated calculating the correlation coefficient between variables.

4.2, Principal Component Analysis

Principal component analysis, as is shown in table 3, tells us the characteristics that are valued and which features need to be improved for Segurikaschool to have better structure and act more efficiently. It also allows joint treatment of the observed variables, so they can be summarized and linked or related. The goal is to contain the majority of the observed variance. The greater variance incorporated implies that it contains a greater amount of information.

Table 3. Principal Component Table

	Components			
ITEMS	1	2	3	4
Information included is clear. Introduction letter, project information and goals are provided.	.663	.512		
App usage is simple. It is easy to open and select a language choice: Basque, Spanish, or English			.962	
The user's manual is simple and the tool's intuitive usage make Segurikaschool a dynamic resource for the classroom.		.653		
I consider the interface, imagery, color, animations, font type, and font size adequate for the students.		.916		.912
The script attached with the CD is enough to operate the multimedia tool.				
The activities are varied and their simplicity allows them to be adjustable to the user's level.	.860			
Students can identify with characters Nita and Preve.	.828			
The resource's interactivity allows student's feedback and positive reinforcement.	.507	.526		
Resource's accessibility allows it to be adapted to students with different abilities.	.827			

Component 1 refers to the information provided prior to the testing period: introductory letter, project information, and project objective. Variance is 33.43%. Component 2 refers to information, its characteristics, user's manual simplicity and usage ease. The intuitive use and the tool's simplicity are favorably viewed. The variance in imagery, color selection, and animation for the tool is 22%. This item obtains the lowest scores on average at 3.72 points, and it is one of the formatting elements that can be improved. Component 3 explores classroom usage of the tool in three possible languages: Spanish, Basque, and English. Variance is 15.87%.

Component 4 concerns the didactic guide. The variance is 14.3%. Concerning the validity and reliability obtained we can affirm that the questionnaire can be extended to a larger number of participants. The questionnaire's information is being triangulated by the data provided by teachers in primary education.

4.3, Findings

The experts value the Segurikaschool didactic guide's clarity and precision in stating the research's goals and objectives. Several authors agree on the necessity for these characteristics in order for individuals to choose to participate (Méndez, 2001). When multimedia tools can be used with ease, the acquisition of new knowledge and abilities are strengthened by these technologies, but, in any case, the most significant element in any educational innovation is the approach and methodology used and not any particular technological feature (Moreira, 2005). Participants received the user's guide and the multimedia tool at the same time. The user's guide's simplified usage, planning, content structure and scheduling was effective.

The multimedia features are key components for this tool because they make multichannel information delivery possible. Thus, helping to achieve the SeDeCo key competencies: knowledge and interaction with the physical environment; autonomy and personal initiative; information treatment and digital competence. Character identification and diversity share the inclusive school principals (Casanova 2003, Soriano 2008, Sleeter 2005). The developing team for Segurikaschool started from the premise that any educational research must count on its future users, and therefore is aimed to be used as an open tool. Similar to other authors, we are aware that tools and teaching materials are not enough to improve injury prevention and school safety without taking into account the context in which these tools and materials are being used (Bosco, 2000). Getting closer to educational reality contributes to increasing functional knowledge when designing injury prevention research projects. The faculty is the promoter, in a contextualized and positive way, which will create innovation in education.

Segurikaschool's graphic interface and animations obtained the lowest scores and it will undergo a redesign and update. Other than the text, videos and other multimedia activities have been suggested to improve the interface and help to reach the aforementioned SeDeCo key competencies.

5. Conclusion

Segurikaschool multimedia tool promotes injury prevention and safety in schools. An expert group helped to develop a questionnaire that was sent to be completed by specialists in the injury prevention and school safety field. This article presents the results of the first part of the questionnaire in which the tool's features, design and ease of use were tested from a multidisciplinary perspective. Assessing this tool from a multidisciplinary perspective contributes to incorporating ideas for updating and continuing to develop the tool. It has been shown that there will always be unnoticed elements to be corrected.

The design of interactive resources provides the basis for the development of learning experiences that can be used by the educational community. Proven quality tools must be researched and designed so these tools encourage the development of cognitive, emotional, motor and relational skills during childhood which is the most vulnerable population and main focus for injury prevention and safety in schools.

This research aims to develop and test an educational resource that will be used to help minimize injuries and promote positive and healthy behavior in schools. Because Segurikaschool uses games and new technologies as an educational tool, it can be defended that Segurikaschool is an adequate tool to acquire the proposed SeDeCo competencies. In its development and in order to be applied in those fields where there is a bigger need, faculty and school administrators' demands have been taken into account. This approach to the educational reality is very useful in designing injury prevention and school safety research projects. The faculty members make change and innovation possible from their contextualized and positive perspective. The main innovation in this educational tool is to integrate it into the regular school curricula activities and materials that promote injury prevention and safety, so these ideas are not just reduced to being included when its "safe-school day" or "injury-prevention week", and they are systematically and continuously planned and evaluated so they target and internalize the safety conducts of children. Segurikaschool multimedia tool is positively valued in its content, but the interface needs

updating. New videos, and more varied activities have been proposed and they will eventually be incorporated in future versions of the tool.

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