Available online at www.sciencedirect.com

ScienceDirect

Procedia - Social and Behavioral Sciences 106 (2013) 935 – 940

Procedia
Social and Behavioral Sciences

4th International Conference on New Horizons in Education

Editor for creating and applying computerise surveys

Humberto Blanco[a], Martha Ornelas[a], José Leandro Tristán[b], Armando Cocca[c], Daniel Mayorga-Vega[c], Jeanette López-Walle[b], Jesús Viciana[c*]

[a]University of Chihuahua, Calle Escorza 900, 31000, Chihuahua, Mexico
[b]University of Nuevo León, Ciudad Universitaria, 66451, San Nicolás de los Garza, México
[c]University of Granada, Carretera de Alfacar s/n, 18011, Granada, Spain

Abstract

The parallel development of the psychometric assessments and the computer technologies determined a big revolution regarding the construction and the application of psychological and educational tests. This report describes a computerized system that allows researchers to creating, applying, and tabulating surveys and paper instruments in an automatized way. Many studies describe the use of this tool, highlighting its main characteristics. This system can be considered a useful tool, since it permits to input data with higher precision and no need for previous codifications. Further, it allows researchers to know the latency period from the answer to each and every item. The prospects about new versions of the system stress on: extending the number of measured topics; creating automatic corrections systems; managing data via internet; and selecting the most valid items to measure each matter or specific groups of persons.

Selection and peer-review under responsibility of The Association of Science, Education and Technology-TASET, Sakarya Universitesi, Turkey.

Keywords: Computerise system; digital tests; psychometric measurements

1. Introduction

The psychometric studies and measurements have been growing in the last decades, at the same time as the computer sciences have strongly developed by means of the advances in and technologies. The application of computers in the research field permits to widen the quantity of contents that can be measured; and to generate handy systems for the correction and the administration of assessment tools via Internet; to select the most suitable items for each and every assessed topic (ideal tests) and for specific groups of individuals (computerised adaptive tests). Many benefits can be obtained by using those systems, but still more research is

* Corresponding author: Jesús Viciana. Tel.: (+34)958246641
E-mail address: jviciana@ugr.es

Selection and peer-review under responsibility of The Association of Science, Education and Technology-TASET, Sakarya Universitesi, Turkey.
doi:10.1016/j.sbspro.2013.12.105

needed to discern the real possibilities of the computerised systems of evaluation (Kyllonen, 1995; López-Pina, Ato, Sánchez, & Velardino, 1990; Olea & Ponsoda, 1999; Olea, Ponsoda, & Prieto, 1999; Renom, 1993).

Prieto, Carro, Orgaz, and Pulido (1993), and Brown (1997), point out that one of the main applications of computers is represented by the construction and the administration of computerised tests, which could eventually substitute the typical paper tests. This could lead to safer, more precise and quicker data storage (with no need for prior codifications) as well as immediate feedback while showing the results. Further, computerised tests permit to measure the latency times for each answer, as well as to create multimedia presentations including text, graphics, pictures, and even videos or simulations.

It is evident that computerised systems of evaluation give more reliable and precise data, at the same time that they increase the efficiency and rapidity of analysis. Moreover, these systems exempt researchers from routine and mechanical tasks, so that they have enough time for the interpretation and the discussion of the outcomes (Moreno, Oña, Martínez, & García, 1998).

This project aims to construct and show a computerised system that makes researchers create, apply and tabulate paper questionnaires and surveys in an automatic way.

2. Logical development of the theme

The editor of surveys in its version 3.0 represents a technological development of previous software, which permits researchers to create and apply paper tests using an automatized system. It is constituted by four sections: instrument development; instrument administration; results collection; and configuration.

Within the instrument development section, researchers can create items and define the variables in which results will be stored (figure 1).

Fig. 1. General information screen, instrument development section

El título de la figura 1 hay que ponerlo más separado de la imagen. Y figura 4 muy separado (posiblemente a mis cambios). Igualmente, dado que hay poco texto, y que las letras no se ven muy bien, yo pondría las imágenes más grandes (no distorsionar, tira de la esquina).

The instrument administration section represents the user interface for the survey respondents, and stores their answers, the time spent in answering, as well as their doubts and attempts for each item (figure 2).

Fig. 2. Main menu, instrument administration section

Using the results collection section, it is possible to save the answers, the times and doubts of each survey respondent in text formats. The conversion of data into text makes to import the outcomes to any statistics software easier and quicker (figure 3).

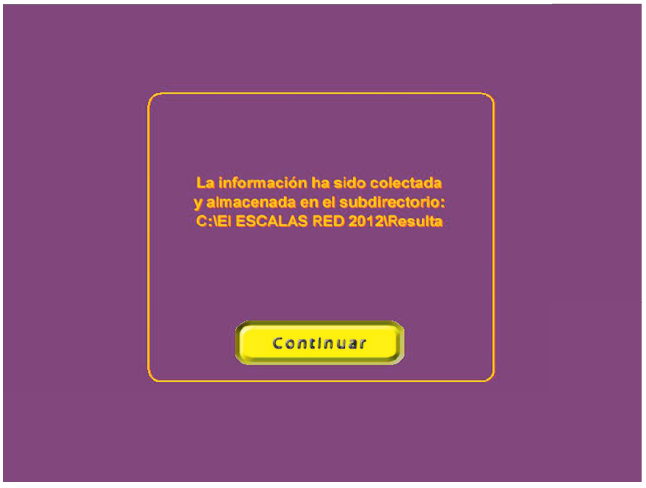

Fig. 3. Display example for the results collection section

Within the configuration section, researchers will be able to choose the relevant characteristics of the user interface, such as colours, font size, coordinates, etc. (figure 4).

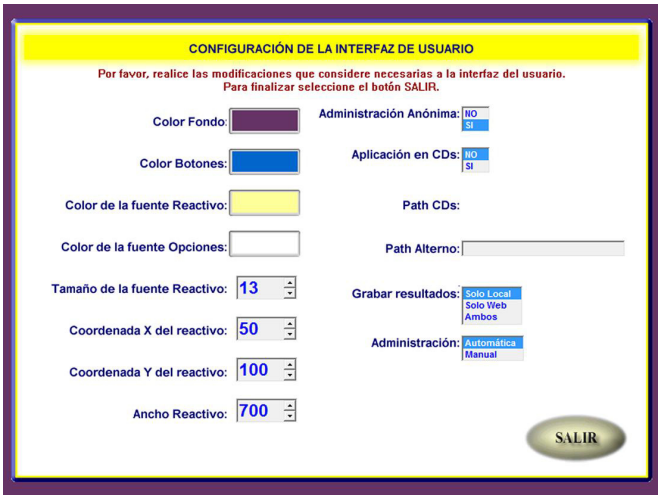

Fig. 4. User configuration display, configuration section

By means of this editor it is possible to define 15 different types of items, according to the information that researchers want to obtain from the surveys respondents. The types of items are described in table 1.

Table 1. Items type description

Item type	Description
Shift bar	The respondent chooses one out of several options by shifting a bottom.
Numerical count	The respondent can increase or reduce a numeric value, or insert a number directly into the system.
Hierarchy	The respondent organizes a hierarchy by means of dragging and dropping.
Free lap	The respondent writes his/her answer in a one-line space.
Mask lap	The respondent writes his/her answer in a one-line space, according to an established format.
List	The respondent selects one out of several options presented.
Fixed check list	The respondent selects a fixed number of options out of several presented. The number of option that can be selected is previously established.
Free check list	The respondent selects one or more out of several options presented.
Memo	The respondent writes his/her answer in a multi-line space. The answer is recorded into an independent text archive.
Proportionality	The respondent assigns points or percentages to each and every option in the item.
Radio 2 options	The respondent can select his/her answer by means of two bottoms.
Current-wished-change	The respondent tells the current and wished frequency of a certain action. Further, he/she tells how much effort would put in improving this action.
Ability-interest	The respondent says how able he/she perceives himself/herself and how interested he/she would be in improving a certain action.
Double numerical counter	
Double list	

The editor also allows generating "skips" within the survey. It means that when a determined answer entails avoiding asking for more information on the same topic, the system will automatically skip to the items of the next theme (figure 5).

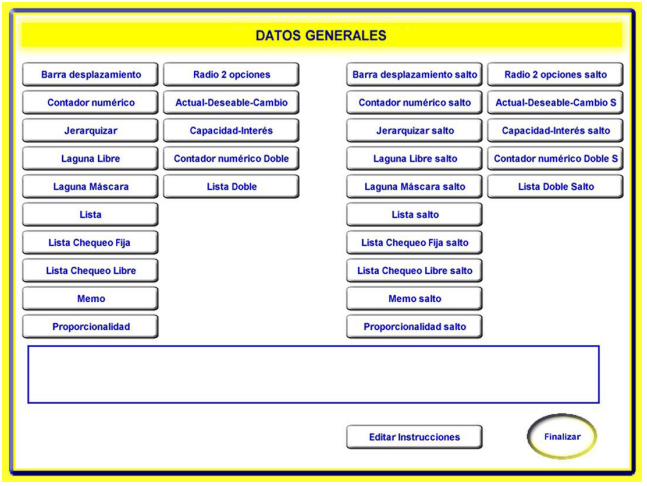

Fig. 5. Types of items, instrument editor

3. Implications and conclusions

According to the objectives postulated and to the outcomes determined by using the trial version of this system, we can consider it as an effective tool to create measurements instruments, since it permits the data storage with no previous codification stages, and it assure more precision, rapidity, and reliability when compared to paper instruments.

Our outcomes are confirmed by Moreno et al. (1998), who state that the main contribution of this kind of editors to the social sciences field consists in representing a viable and effective model for using computers while elaborating, creating and grading scales. This statement has an effect on the reliability of data obtained. Furthermore, the phases of collecting and tabulating data can be carried out in an easier and quicker way, saving time for more difficult tasks such as the interpretation of the outcomes.

The expectations towards a new version of the editor are focused on widening the objects to be measured; creating solid correction systems; selecting the best items according to the topic studied (ideal tests) or according to a specific group of individuals (computerised adaptive tests); and enhancing the administration via Internet.

Acknowledgements

We thank Aliisa Hatten for the English revision. This work was developed under the framework of the International Network “Sciences of Physical Activity, Sport and Education” supported by the Ministry of México (Public Education Secretary). Daniel Mayorga-Vega is supported by a research grant from the Spanish

Ministry of Education (AP2010-5905).

References

Brown, J. D. (1997). Computers in language testing: Present research and some future directions. *Language Learning & Technology, 1*(1), 44-59.

Kyllonen, P. C. (1995). Principles for creating a computerised test battery. *Estudios de psicología*, *17*(1), 27-40.

López-Pina, J. A., Ato, M., Sánchez, J., & Veladrino, A. (1990). Test y diagnóstico por computador. In S. Algarabel & J. Sanmartín (Eds.), *Métodos Informáticos Aplicados a la Psicología.* Madrid: Pirámide.

Moreno, F. J., Oña, A., Martínez, M., & García, F. (1998). Un sistema de simulación como alternativa en el entrenamiento de habilidades deportivas abiertas. *Motricidad, 4*, 75-95.

Olea, J., & Ponsoda, V. (1999). Tests informatizados y adaptativos informatizados: Investigación en España. *Revista ELectrónica de Investigación y Evaluación Educativa, 4*.

Olea, J., Ponsoda, V., & Prieto, G. (Eds.) (1999). *Tests Informatizados: Fundamentos y Aplicaciones*. Madrid: Pirámide.

Prieto, G., Carro, J., Orgaz, B., Pulido, R. F., & Gonzáles-Tablas, M. (1993). Uso del Hypercard para la construcción de tests informatizados de aptitudes espaciales. *Psicológica, 14*, 229-237.

Renom, J. (1993). *Tests Adaptativos Computarizados: Fundamentos y Aplicaciones*. Barcelona: PPU.