Derived Importance-Performance Analysis in Determining Technological Tools Applied to The Learning Process

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ABSTRACT

Present paper study effectiveness in the evaluation of technological tools applied in learning process. The paper proposes to evaluate these tools to determine the contribution of them in terms of user's perceptions. Importance performance analysis with derived importance and diagonal model was applied to cover this objective. The results reveal the technological tools most involved in the process. Conclusion revealed that the use of IPA analysis permit to achieve better decisions about the use of technological tools that involve financial resource consumption.

KEYWORDS: Learning process; Importance performance analysis

INTRODUCTION

The constant introduction of technology in our daily life and therefore in our classrooms is a subject of great interest among researchers interested in analyzing the effect of its introduction on educational outcomes. With greater assiduity, education professionals observe how technology becomes a point of reference in students and an element that captures their attention and concentration.

This leads them to consider the role that technology should play in the educational process. At the same time, it is a matter of concern to them, among other reasons, for the proximity to the University access of Generations of so-called digital natives.

The passing of these generations through the university classrooms will give rise to a moment of deep reflection about the need to adapt to their reality of interaction, in order to achieve success in the learning process.

The new technologies have gradually been incorporated in the different educational levels, seeking operational and communicative efficiency in the transmission of information. This introduction has led to a wide advance in universities and distance courses or in blended courses that combine the presence with an online component.

Although the new challenge is to face its incorporation with an optic that raises the search for significant experiences for the student, allowing to cover the aspects of the dimensions collected in the Bloom's Taxonomy.

On the other hand, it is considered equally relevant to use communicative and interaction skills for the development of collaborative learning through the use of new technologies. In this respect, the UNESCO Chair of Information Management in Organizations has a long history in the study of collaborative learning and today there are experiences that support such importance, such as the cases analyzed by Ortigueira-Sánchez and Gómez-Selemeneva (2016) or Olivos, Rincón and Rutkowski (2015).

Consequently, there is a scenario in which, on the one hand, there is a strong current and future development centered on online teaching, with a proliferation of courses and proposals in a distance modality by universities, and on the other, a face-to-face teaching immersed in the need to compete with technological devices.

Although Table 1 shows the most recent studies on technology applied to learning, which have been developed in the area of business and published in the Web of Science, and it reflects a wide interest and diversity in the subject; the reality in its application to the university sphere does not seem to have given the expected results.

Failures stories in the application of online courses at the university level, such as the case of UDACITY and the San Jose State University (California), in which an agreement between both would grant university credits to courses followed at a distance, give proof of it.

Table 1: Recent studies on technology and learning

Author	Subject
Olivos et al., 2015; Benson and Filippaios, 2015	Collaborative learning
Tawfik et al., 2015	Remote laboratories
Cosgrove et al., 2015	Retention of online vs. online face-to-face knowledge
Antonaci et al., 2015	Game design techniques (gamification) applied to learning
Toit-Brits, 2015	Challenges in the application of e-learning in locations with digital divide
Trauth et al,. 2015; González-Pernía et al. 2015; 백종옥 et al., 2015; Rampersad, 2015	Knowledge and Technology Transfer, University-Industry collaboration
Fitzgerald et al. 2015	MOOC, Open Learning
서한결et al., 2015	Learning Ecosystem
Hewagamage and Hewagamage, 2015	University Technology Competencies
Ali et al., 2014; Bachiller and Bachiller, 2015; Ortigueira-Sánchez and Gómez-Selemeneva, 2016	Contribution of technology in classroom

METHODOLOGY

For the following analyzes, the survey of Ortigueira-Sánchez y Gómez-Selemeneva (2016) was taken, which took a sample of students of degree who were divided in diverse groups of practical lessons. After a course during which intensive use of technological innovations was made, a questionnaire about their perception regarding their contribution to the learning process was applied to these students.

The questionnaire consisted of questions on a Likert scale of 1 to 7, with 7 being the highest value on the scale and one indicating the lowest degree of satisfaction. On the basis of the results of this study, they were homogenized through a standardization of the same on a uniform scale, according to Miller and Miller (1991).

An analysis (IPA) of importance-performance was carried out (Martilla and James, 1977), with a diagonal model as proposed by Bacon (2003) and Ábalo, Varela and Rial (2006). We chose the IPA model with derived importance from correlation values as suggested by Ortigueira-Sánchez, et al. (2015). Note that although the model of derived importance from correlation has been chosen, all variables were included in the graph regardless of whether it was significant or not and with the intention of observing the position they occupy in it.

RESULTS AND DISCUSSION

Table 2 presents the results of the correlations of the analyzed variables. Note that those associated with self-evaluation tests and twitter were not significant, with the rest related to positive and direct relationship.

Table 2: Matrix of Correlations

Correlations

		Prezi	Twitter	email	videoconfe	autotest	materialwebct	videos	dropbox	Sat.global
Prezi	Pearson correlation	1	0,029	0,160	,286*	,319*	0,217	0,229	,311*	,433**
	Sig. (bilateral)		0,824	0,218	0,025	0,012	0,087	0,081	0,015	0,000
Twitter	Pearson correlation	0,029	1	,506**	0,067	-0,065	-0,124	0,050	,258*	0,162
	Sig. (bilateral)	0,824		0,000	0,612	0,620	0,336	0,708	0,047	0,213
email	Pearson correlation	0,160	,506**	1	,296*	0,212	0,168	,296*	,289*	,388**
	Sig. (bilateral)	0,218	0,000		0,024	0,110	0,200	0,027	0,028	0,002
videoconfe	Pearson correlation	,286*	0,067	,296*	1	0,238	,276*	,468**	,284*	,546**
	Sig. (bilateral)	0,025	0,612	0,024		0,072	0,033	0,000	0,031	0,000
autotest	Pearson correlation	,319*	-0,065	0,212	0,238	1	,516**	0,108	0,138	0,212
	Sig. (bilateral)	0,012	0,620	0,110	0,072		0,000	0,425	0,299	0,106
materialwebct	Pearson correlation	0,217	-0,124	0,168	,276*	,516**	1	0,180	0,068	,329**
	Sig. (bilateral)	0,087	0,336	0,200	0,033	0,000		0,172	0,601	0,010
videos	Pearson correlation	0,229	0,050	,296*	,468**	0,108	0,180	1	,464**	,571**
	Sig. (bilateral)	0,081	0,708	0,027	0,000	0,425	0,172		0,000	0,000
dropbox	Pearson correlation	,311*	,258*	,289*	,284*	0,138	0,068	,464**	1	,500**
	Sig. (bilateral)	0,015	0,047	0,028	0,031	0,299	0,601	0,000		0,000
Sat.global	Pearson correlation	,433**	0,162	,388**	,546**	0,212	,329**	,571**	,500**	1
	Sig. (bilateral)	0,000	0,213	0,002	0,000	0,106	0,010	0,000	0,000	

*.Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

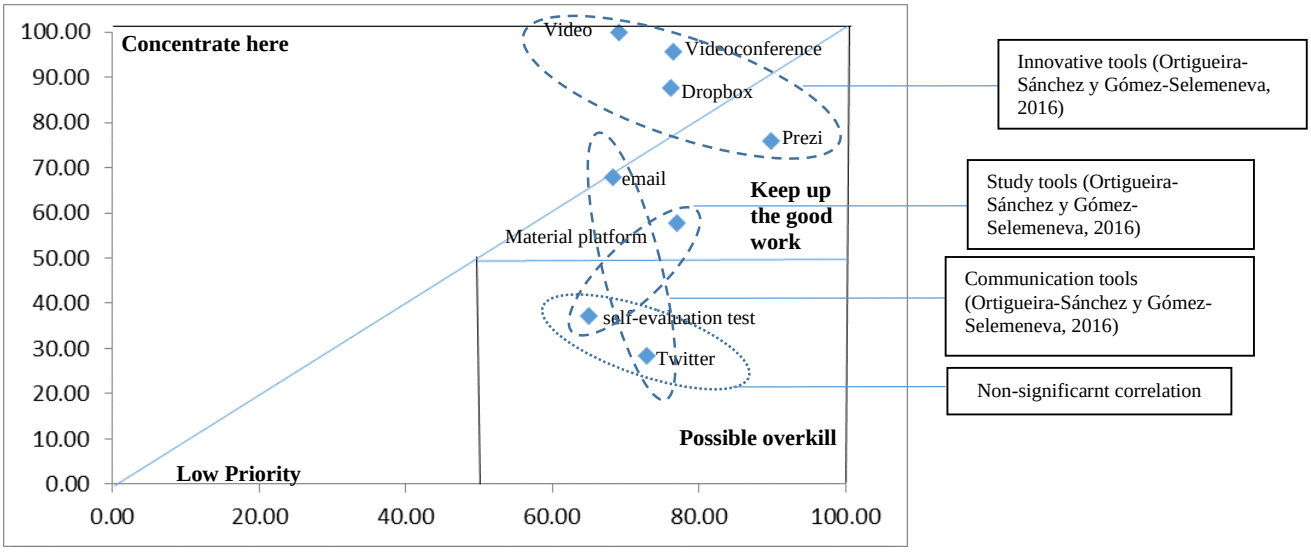
Based on the proposed methodology, the results of the IPA analysis are presented in figure 1. The variables according to the factorial dimension explained in Ortigueira-Sánchez and Gómez-Selemeneva (2016) have also been identified in the figure.

Emphasize that several of the technological tools considered innovative are located in the quadrant that demands greater attention. Those that might be considered basic attributes (email and platform material) are located in the 'Maintain Good Job' area.

Emphasize that several of the technological tools considered as innovative are located in the quadrant that demands greater attention. Those tools (email and platform material) that we could consider basic (Study tools – cognitive domain in Bloom's Taxonomy) are located

in the area of 'Keep up the good work'. This could be due to the thorough preparation of the web material and our strategy of rapid response to emails. In fact, one of the complaints in the experience of Udacity and San Jose State University was related to the lack of feedback in the student's doubts

Figura 1: Derived Importance-Performance results



In the case of the analyzed tools, it can be observed that none of them was placed on the low priority quadrant. That is why all of them can be considered relevant except for those that were not significant. In this case the use of these tools could be questioned (self-evaluation test and twitter).

CONCLUSION

As it has been seen in the results, the use of the IPA analysis allows to make better decisions on the use of technological tools whose use implies consumption of resources. Since the measurement of technological tools does not cover the wide range of tools available, it is recommended to analyze existing ones in order to establish a conglomerate of tools more suitable to be applied. These could be for example wikis, blogs, virtual whiteboards, etc. The importance of asynchronous feedback (email) stands out against the non-significant correlation shown by synchronous communication (twitter).

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