PRINT: ISSN 0972-0073 ONLINE: 2456-6802
Anthropologist 25(3): 199-206 (2016)
DOI: 10.31901/24566802.2016/25.03.02

Influence of Project-based Learning Model in Knowledge Management of Educational Psychology Students

Eva M. Romera[1], Olga Gómez-Ortiz[2], Rosario Ortega-Ruiz[3] and Carmen Viejo[4]

University of Cordoba, Spain, 14004
E-mail: eva.romera@uco.es

KEYWORDS Colleges. Decision-making. Effects. Evaluation. Methodology

ABSTRACT Knowledge management is presented as a model to achieve that college graduates apply their knowledge to solve complex problems in an effective way. It is defined by three basic dimensions, that is, structural, relational and cognitive. Project-based Learning methodology could promote positive effects in knowledge management. The aims of this study were to analyze the psychometric properties of the *Evaluation of Competences to Management Knowledge Questionnaire* and evaluate the effect of Project-based Learning on knowledge management. There were two studies performed. In study 1 448 students participated (76.8% female) between 18 and 47 years old (M = 21.93; SD = 7.97). In study 2 there were 215 students. The EFA and CFA analyses pointed out the adequacy of three dimensions' model. Results showed a significant and positive effect of Project-based Learning. This study underscores the need to move students towards higher-order psychological tasks in which shared decision-making and self-regulation are included.

INTRODUCTION

According to Kottak (2002), anthropology is the most genuine and comprehensive field of social sciences. Its objective is the scientific and humanistic study of the human being considered in its broadest diversity, and assuming that it always lives in the context of a place, a time and a culture, which encourages and limits her. Thus, anthropology is always alive, and it is always up to date because it always deals, or should deal with the transformation of the humans impacted by the conditions in where they live. If this is so, there is no doubt that at this point in time, and considering the contributions from the great scientists of social, economic and cultural science who explained the parameters of globalization, one is in the era of knowledge. That is, one lives in the knowledge society, which possibly forces one to go beyond Manuel Castells' (1996) assumption about the potential use of the communication technologies. Understanding knowledge, and especially its use as a tool for producing new knowledge, is not a simple task. It requires explaining exactly how far the competencies to manage knowledge and know-how could take one beyond what is expected in terms of learning and development. In higher education, it should mean the understanding of how a well-designed stimulus can promote on young graduates and postgraduates the activation of all their capabilities. Because higher education only fulfills its aim when someone learns how to learn and when the ability to keep learning is mastered. Actually the education at university level must meet the challenge of preparing new generations, so that they might be able to use and select knowledge and learning in several contexts and throughout life itself, in order for them to adapt this which has been learned to new situations (Brand-Gruwel and Stadtler 2011; Freire et al. 2013). Since some years the knowledge has emerged as a well of great strategic value and ways to create, manage, sought, control and possess such knowledge are required. Conceptualizing knowledge creation and management is a highly complex task and is understood as a strategy that facilitates and promotes a set of systematic processes ranging from the identification of knowledge, through treatment, development, creation and socialization until use (Gairín and Rodríguez-Gómez 2012).

This ability to continuously build knowledge is possible through social learning models whose benefits go beyond the scope of individual progress (Huber 1991). In this line, the model of knowledge management (KM, hereinafter), originally from the organizational field, has been identified as a framework for the development of processes for capturing, creating, updating,

Address for correspondence:
Eva M. Romera Félix.
Avda. San Alberto Magno,
S/n. Facultad de Ciencias de la Educación,
Universidad de Córdoba. 14004. Spain
Telephone: 0034 957 212076

transferring and renewing of knowledge (Nonaka and Nishiguchi 2001).

The multidisciplinary linked to the study of KM leads to different perspectives, which can be grouped into three main lines (Biasutti and EL-Deghaidy 2012; Ferguson 2016), that is, a) models of storage, access and transfer of knowledge, that are based on strategies and techniques for storing information, b) models focusing on technological aspects, in which the management of technological systems and tools that help the dissemination of knowledge is the most visible aspect, and c) sociocultural models, where the emphasis is on developing an appropriate organizational culture for KM, through the promotion of communication processes, collaboration, and leadership. It is important to note the three perspectives to promote KM.

In education, KM is becoming an area of growing interest (Chu 2016). University education, as an interactive and dynamic space that seeks production, but no reproduction of scientific knowledge, becomes a privileged context to promote KM (Biasutti and EL-Deghaidy 2012; Brewer and Brewer 2010). This means creating learning environments that promote the main processes of KM within the university context (Cheng and Cheng 2008; González and González 2016).

The theoretical contributions have recognized some basic processes within KM, which emphasize the three basic aspects (Nonaka 1991; Schmitt 2015), that is, a) information management, which refers to the access, acquisition and creation of knowledge, b) managing interpersonal relationships, referred to transferring and sharing knowledge processes for a collaboration culture, and c) application and innovation, which involves decision-making.

The development of methodologies aimed at promoting these processes and measuring their positive effects become a priority in teaching in the university. In this line, Project Based Learning (PBL) is an active didactic methodology, with its positive results regarding students' competence development being demonstrated (Williams van Rooij 2009; Romera et al. 2016). Recent studies have shown that innovative proposals such as e-portfolio are positive for KM-purposes (Chang 2015). However, it has not been observed its association with active methodologies like PBL, which instructional features are close to the KM's processes. PBL promotes interpersonal relationships for support and collaboration, and enhances the ability to solve problems, basic aspects of KM (Santo 2005). In PBL, students collaborate in small working groups to achieve a common goal. Problem solving is done by asking questions, debating ideas, gathering information, designing lines of action and outlining conclusions (Lam 2010). This approach promotes self-directed learning (Blumenfeld et al. 1991). In conclusion, the purpose of the PBL heads towards the creation of contexts of potential learning, which allow students to develop the necessary abilities to apply the knowledge in an effective way.

Assessing the effects of PBL in KM also requires having instruments to measure it that fit its definition and have optimal validity and reliability. Recent research recognized the need for instruments to measure student competence development (Conchado et al. 2015). The *Knowledge Management Questionnaire* (KMQ) is an instrument designed to measure the application of KM processes in online Wiki collaborative activities (Biasutti and EL-Deghaidy 2012). *Key Successful Factor* (KSF, Chang et al. 2015) assesses the KM on e-portfolio. However, both instruments are adapted to the field of new technologies and do not show signs of validity of the measurements used. Thus, it is necessary to move towards the design of suitable measuring instruments for various methodological proposals, not only online with optimal psychometric properties.

Objectives

The first aim of this study was to analyze the psychometric properties of an instrument to evaluate competences to KM. The second one was to evaluate the effect of the PBL model on KM in college students of Educational Psychology. It is hypothesized that the psychometric properties of the designed instrument will address the three categories of KM, namely, information management, sharing information, and application and innovation. It was also hypothesized that the practice of PBL will promote positive effects on KM competences.

MATERIAL AND METHODS

Participants

The sample was incidental by accessibility. To validate the instrument (study 1) a large sam-

ple was used that included students from the second course of *Primary and Early Education Degree* in the academic year 2013-2014. The participants were 448 students (76.8% female) between 18 and 47 years old (M = 21.93; SD = 7.97). To reach the second aim (study 2) an intervention program was developed. The sample was formed only by the students of the second course of *Educational Psychology of Early Education Degree* who took the subject where in the teacher developed the program. It was done in the academic year of 2014-2015. The participants were 215 students (90.1% female) between 19 and 41 years old (M = 21.53; SD = 3.38).

Instruments

The Evaluation of Competences to Management Knowledge questionnaire (ECMaK) was used. This is a self-report Likert type questionnaire comprising of 15 items with ten response options each (1 = *totally disagree* and 10 = *totally agree*). The items refer to the student's perception of their own competences and skills to manage the information, to analyze and solve problems and to manage interpersonal relationships in the academic context. Its psychometric properties were analyzed.

Procedure

The study 1 has an instrumental design. The study 2 hasa longitudinal pre-post design (Montero and León 2007). For study 1, the questionnaire was administered once in the course. For the study 2, the questionnaire was administered at the beginning and end of the curse. During the course, the students worked the practices of the subject with a group project in which they had to develop an intervention to solve a hypothetical educational problem, which could be often in their future work as teachers. Researchers thought that this project would help improve their management knowledge competences, and so, when they finished the work at the end of the course, it was assessed again their perceptions about it with the developed questionnaire. The anonymity, confidentiality, and the voluntary nature of the students' participation were always emphasized. The average completion time of the questionnaire varied between 20 and 30 minutes. The study was carried out in accordance with the Declaration of Helsinki.

Statistical Analysis

Study 1

Following the recommendations made by Neukrug and Fawcett (2014) to validate questionnaires, the sample was divided into two parts, taking gender as the selection variable with a proportional number of boys and girls. This was done in order to proceed with the exploratory (EFA) and confirmatory (CFA) factor analyses by means of cross-validation, optimizing the generalization of the model by using different subsamples (Delgado-Rico et al. 2012). To obtain evidence concerning the dimensionality of the ECMaK and to select the items for inclusion in the definitive questionnaire, an EFA was performed using the Factor 9.3 statistical software (Lorenzo-Seva and Ferrando 2006), adopting the unweighed least-squares (ULS) estimation method, the Oblimin rotation method, and based on the polychoric correlation matrix, recommended when working with non-normal distribution samples and when the measurement instrument involves ordinal items (Bryant and Satorra 2012). The following items were excluded, that is, items in the EFA with a factor loading below .32 and a communality of less than .40 (Worthington and Whittaker 2006), and those in the CFA that presented factor loadings less than .40 with high measurement errors (Flora and Curran 2004).

To determine the internal validity of the instrument and their factorial structure, confirmatory factor analysis (CFA) was performed using the Maximum Likelihood estimation method with robust correction (Bryant and Satorrra 2012). The model fit was assessed considering the chi-square significance value of Satorra-Bentler (χ^2 S-B) (values greater than .01 indicate a good fit). However, because the value of this index is subject to other variables such as sample size, other indicators were considered. These included the comparative fit index (CFI), the non-normed fit index (NNFI) (values equal to or greater than .90 indicate a good fit) and the root mean square error of approximation (RMSEA) (values less than .08 indicate a good fit) (Byrne 2014; Hu and Bentler 1999). The analysis was performed with EQS 6.2 software.

Given the characteristics of the variables and the absence of multivariate normality, the analysis of internal consistency was based on the results of McDonald's omega (Elosua Oliden and Zumbo 2008), which was calculated using Factor 9.3 software.

Study 2

Pre-post questionnaire data was compared using a nonparametric alternative to the repeated measures t-test appropriate for small samples (Wilcoxon signed-rank test). A significance level of $p<.01$ was used to define low power to detect significance. It is also reported the effect sizes as Cohen's *d*. This analysis was performed with SPSS 18.0 software.

RESULTS

Study 1

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, with a value of .89, and the statistically significant Bartlett's test of sphericity, $\chi^2(105) = 1486.6$; $p<.001$, confirmed the benefits of conducting an EFA. Three factors were applied in this analysis, one for each of the dimensions measured, where the total explained variance was 67.91 percent. Modifying the number of factors returned no conclusive results. Table 1 shows the eigenvalues of the components, factor loadings, communalities and for each item. The factor loadings were between .17 and .85. The highest communality was .75 and the lowest was .43. Moreover, the items of factor 1, 2 and 3, which showed the highest percentage of variance accounted for by these factors were item 2($R^2 = .68$), item 7 ($R^2 = .80$) and item 15 ($R^2 = .77$).

The first factor, entitled "interpersonal relationships", yielded an explained variance of 48.9 percent and comprised five items referring to competences, which favor good social relationships in group equipment, and let give priority to group interests more than individuals. The second factor, "information management", yield-

Table 1: Items and dimensions of ECMaK with factor loadings, communalities (EFA) and R^2 (CFA) for each item and the eigenvalues of each component

Item	*F1*	*F2*	*F3*	*Commun.*	R^2
1. Mantener una comunicación fluida [Maintain good communication]	.59			.51	.55
2. Establecer una meta común dentro del grupo de trabajo [Establish a common goal within the workgroup]	.54			.43	.68
3. Priorizar los intereses colectivos sobre los personales [Prioritize collective interests over personal ones]	.80			.68	.65
4. Evaluar la actuación del grupo de trabajo y hacer críticas constructivas [Evaluate the working group's attitude and give constructive criticism]	.85			.73	.48
5. Trabajar en red: compartir y articular tareas entre los miembros del grupo para alcanzar una meta compartida [Work in network: share and coordinate tasks among group members to reach a shared goal]	.73			.56	.38
6. Utilizar distintas fuentes de información [Use different sources of information]		.74		.70	.77
7. Seleccionar información de carácter científico y relevante [Select scientific and relevant information]		.84		.75	.80
8. Capacidad para comparar interpretar y articular distintas aportaciones teóricas [Capability to understand, compare, and coordinate different theoretical contributions]		.71	.31	.77	.67
9. Elaborar un texto original fundamentado en trabajos de carácter científico [Write an original text based on other scientific works]		.64	.33	.72	.51
10. Redactar de manera coherente y estructurada la información [Compose a coherent and structured text]		.32	.39	.48	.47
11. Aplicar la teoría a la práctica [Apply the theory to practice]	.37	.32	.17	.43	.48
12. Capacidad para definir un problema e identificar sus causas [Ability to define a problem and identify its causes]			.46	.51	.46
12. Diseñar intervenciones ajustadas a las necesidades educativas [Design interventions which fit the educational needs]			.67	.50	.64
14. Identificar recursos materiales y humanos que puedan usarse para dar respuesta a un problema [Identify human and material resources that can be used to address a problem]			.71	.70	.62
15. Valorar la coherencia entre la solución del problema y el objetivo inicial [Assess the coherence between the solution and the initial target]			.57	.52	.77
Eigenvalue		6.96	1.23	0.87	

ed an explained variance of 10.55 percent and comprised five items that describe the ability to use and select information and its application to make a text. The third factor, "application and innovation", with an explained variance of 8.40 percent, was made up of five items related to skills to analyze practical situations and to solve them applying material or human resources.

The results of the CFA verified the factorial structure of three factors, showing the following fit indices of χ^2 S-B = 128.95 (87); p<.001; NNFI = .92; CFI = .93; RMSEA = .05. Moreover, the factor loadings and the correlation between the factors were statistically significant. The parameters of the proposed model are shown in Figure 1. All of the factor loadings were significant and elevated ($.62 \leq \gamma s \leq .90$).

To assess the reliability of the instrument, internal consistency was analyzed. A Mc-Donald's omega total of .92 was obtained, and

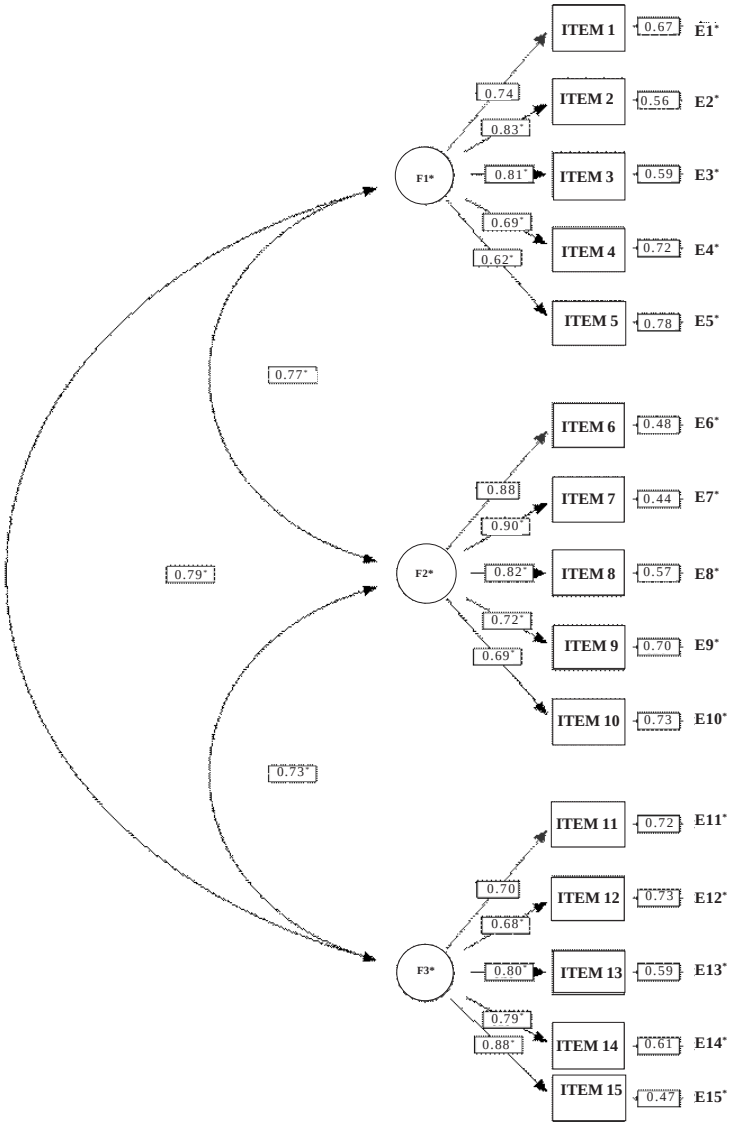

Fig. 1. CFA standardized coefficients in the items belonging to the ECMaK

of .83, .85 and .83 for the *interpersonal relationships*, *information management* and *application and innovation* scales, respectively.

Study 2

With regard to pre-post differences in the perception of knowledge management competences, the Wilcoxon signed-rank test showed significant differences between pre and post measures of interpersonal relationships, information management and analysis and solution of problems. It was found that post-test levels were higher than pre-test in all the scales, indicating a positive effect of practical work through project, which improved the student's knowledge management perception. The effect size was moderate and high (see Table 2).

DISCUSSION

This work has tried to bring closer the main parameters of the knowledge society with the practice of university education. It has been assumed that adults and highly developed human beings as it is, or should be, the case of college students can and should go further in developing their own skills to learn. That stems from the statement of the knowledge society, which highlight that currently, learning is, or should be, in addition, learning to learn. Mastering the competences to continuously learn implies that each trainee, in this case college students, assume that they are builders of their own knowledge and that within this construction an essential tool for progress generates, that is, mastering the management of their ability to learn (Joliffe 2015). Particularly, this study was based on two objectives. On the one hand, the objective was to design and validate a scale for measuring KM according to its theoretical basis and applicable to any teaching context. On the other hand, evaluating the effects caused on KM by a work proposal based on PBL with university students.

The results showed evidence of validity of the scale ECMaK, which is focused on the three dimensions of a) information management, b) interpersonal relationships, and c) application and innovation, which are the processes outlined in the scientific literature as defining KM (Nonaka 1991; Schmitt 2015). The scales had good reliability, validity indices and good-fit of the data (Hu and Bentler 1999; Byrne 2014; Neukrug and Fawcett 2014). It is, therefore, a new suitable measuring instrument for university students and applicable to any type of active methodology that promotes KM. Up until this point the available instruments were adapted to e-learning experiences and did not show validity indices (Biasutti and EL-Deghaidy 2012; Chang et al. 2015).

These results highlight the need of promoting, within university studies, learning experiences where students have the opportunity to interact with partners, and to share and build together the knowledge. Also, it is necessary to promote student learning to enable them to know how to look for, select, analyze and interpret the information. Finally, it is essential that the students are able to use what they have learnt to solve academic and professional situations. In this line, it was hypothesized that PBL is a methodology, which promotes the development of the dimensions of KM due to its nature (Lam 2010; Ferguson 2016) and its demonstrated positive effects (Dochy et al. 2003; Romera et al. 2016).

The results showed that the effects of PBL on KM were positive, coinciding with the meta-analysis (Dochy et al. 2003). This indicates that the PBL methodology promotes the development of learning environments that fit the demands of today's society (Brand-Gruwel and Stadtler 2011; Freire et al. 2013). In this society, searching KM competences is pointed out as an important point to consider in the context of university education (Cheng and Cheng 2008; González and González 2016). Previous longitu-

Table 2: Pre-post comparison about perceptions of management knowledge competences

	Pre-test M (SD)	*Post-test M (SD)*	*Cohen´s D*	*Z Wilcoxon*	*Significance*
Interpersonal relationships	7.86 (1.17)	8.41 (1.11)	-.48	-4.58	.000
Information management	7.28 (1.36)	8.34 (1.13)	-.85	-7.51	.000
Application and innovation	7.31 (1.18)	8.06 (1.12)	-.65	-6.00	.000

dinal studies showed effects linked mainly to individual character variables (see meta-analysis Dochy et al. 2003). This work points out that the benefits from PBL are also associated with interactive and management competences, which produce a recognized social benefit. It means that the implementation of these educational experiences at university level promote awareness and collective decision-making, and basic skills for lifelong learning (Uzunboylu and Sarigoz 2015). These results should be interpreted in a number of limitations that in turn become future research. Firstly, the sample is reduced, so it would be necessary to extend the study population to other subjects and academic studies, which would confirm the factor structure of the instrument used and the results obtained. Secondly, the questionnaire is a self-report, and student's answer could be biased.

CONCLUSION

This work helps university teachers identify the factors that influence the development of competences to prepare them under professional profile demand in today's society. The results showed a significant effect of PBL. In all the dimensions measured, the perception of competence development for knowledge management was higher in the posttest phase. These results make one aware of the importance of the development of methodologies aimed to learn not only to solve a specific problem, but also to develop strategies to successfully meet any type of situation. In short, this is what has been called learning to learn.

In conclusion, this study underscores the need to move towards methodologies, which promote experiences beyond the individual information management, and they should enable the students move towards higher-order psychological tasks in which shared decision-making and self-regulation are included.

RECOMMENDATIONS

This study is recommended for professionals in the educational, work and social contexts. The provided results support the need for coordination between what society demands and what the school offers for training their graduates. Design approaches going in line with both, are a benefit for student learning,and as it has been seen in this work, a benefit for the society.

ACKNOWLEDGEMENTS

This study was carried out into the project of educational innovation, "The methodology of Project Based Learning to promote competence development of university students", financed by University of Cordoba, Spain.

REFERENCES

Biasutti M, EL-Deghaidy H 2012. Using Wiki in teacher education: Impact on knowledge management processes and student satisfaction. *Computers and Education*, 59: 861–872.

Blumenfeld PC, Soloway E, Marx RW, Krajcik JS, Guzdial M, Palincsar A 1991. Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist*, 26: 369-398.

Brand-Gruwel S, Stadtler M 2011. Solving information-based problems: Searching, selecting and evaluating information. *Learning and Instruction*, 21: 175-179.

Brewer PD, Brewer KL 2010. Knowledge management, human resource management, and higher education: A theoretical model. *Journal of Education for Business*, 85: 330-335.

Bruner JS 1978. *El Proceso Mental En El Aprendizaje.* Barcelona: Narcea.

Bryant FB, Satorrra A 2012. Principles and practice of scaled difference Chi-Square testing. *Structural Equation Modeling: A Multidisciplinary Journal*, 19: 372–398.

Byrne B 2014. *Structural Equation Modeling With Lisrel, Prelis, and Simplis: Basic Concepts, Applications, and Programming (Multivariate Applications Series)* (Reprint Edition). New Jersey: Psychology Press.

Castells M 1996. *La era de la información. Economía, Sociedad y Cultura. Vol.1 La Sociedad Red.* Madrid: Alianza Editorial.

Chang C, Liang C, Shu K, Tsai H 2015. Key successful factors of knowledge management for university students using e-Portfolios: Approach of Fuzzy Delphi and Fuzzy AHP. *Computer Applications in Engineering Education*, 23: 673–681.

Cheng KW, Chen YF 2008. The process of integrating "knowledge management" into teacher's "teaching resources" – a case study on the hospitality college. *Journal of Instructional Psychology*, 35: 380-386.

Chu KW 2016. Beginning a journey of knowledge management in a secondary school. *Journal of Knowledge Management*, 20: 364-385.

Conchado A, Carot JM, Bas MC 2015. Competencies for knowledge management: Development and validation of a scale. *Journal of Knowledge Management*, 19: 836-855.

Delgado-Rico E, Carretero-Dios H, Ruch W 2012. Content validity evidences in test development: An applied perspective. *International Journal of Clinical and Health Psychology*, 12: 449–459.

Elosua-Oliden P, Zumbo BD 2008. Coeficientes de fiabilidad para escalas de respuesta categórica ordenada. *Psicothema*, 20: 896–901.

Flora DB, Curran PJ 2004. An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological Methods*, 9: 466–491.

Ferguson JE 2016. Inclusive perspectives or in-depth learning? A longitudinal case study of past debates and future directions in knowledge management for development. *Journal of Knowledge Management*, 20: 4-22.

Freire MJ, Tejeiro MM, País C 2013. La adecuación entre las competencias adquiridas por los graduados y las requeridas por los empresarios. *Revista de Educación*, 362: 13-41.

Gairín J, Rodríguez-Gómez D 2012. El Modelo Accelera de creación y gestión del conocimiento en el ámbito educativo. *Revista de Educación*, 357: 633-646.

González GR, González IAR 2016. Design, measurement and analysis of a Knowledge Management model in the context of a Mexican Univer sity. *Innovar*, 26: 21-34.

Hu L, Bentler P 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6: 1–55.

Huber GP 1991. Organizational learning. The contributing processes and the literatures. *Organization Science*, 2: 88-115.

Jolliffe W 2015. Learning to learn together: cooperation, theory and practice. *Education*, 43: 1-4.

Kottak PC 2002. *Antropología Cultural*. Barcelona: MacGraw-Hill.

Lam S, Cheng RW, Choy HC 2010. School support and teacher motivation to implement project-based learning. *Learning and Instruction*, 20: 487-497.

Lorenzo-Seva U, Ferrando PJ 2006. FACTOR: A computer program to fit the exploratory factor analysis model. *Behavioral Research Methods, Instruments and Computers*, 38: 88–91.

Montero I, León OG 2007. A guide for naming research studies in Psychology. *International Journal of Clinical and Health Psychology*, 7: 847–862.

Neukrug E, Fawcett R 2014. *Essentials of Testing and Assessment: A Practical Guide for Counselors, Social Workers, and Psychologists*. Stamford: Cengage Learning.

Nonaka I 1991. The knowledge-creating company. *Harvard Business Review*, 69: 96-104.

Nonaka I, Nishiguchi T 2001. *Knowledge Emergence: Social, Technical, and Evolutionary Dimensions of Knowledge Creation.* New York: Oxford University Press.

Romera EM, Del Rey R, Ortega-Ruiz R 2016. Assessing the impact of problem-based learning in university students. *British Journal of Education, Society and Behavioural Science*, 13: 1-9.

Rowley J 2000. Is higher education ready for knowledge management? *International Journal of Educatio-nal Management*, 14: 325-333.

Santo SA 2005. Knowledge management: An imperative for schools of education. *Tech Trends*, 49: 42–49.

Schmitt U 2015. Quo Vadis, Knowledge Management: A regeneration or a revolution in the making? *Journal of Information and Knowledge Management*, 14: 1-20.

Uzunboylu H, Okan Sarigoz O 2015. The evaluation of anthropological attitudes towards social professional and lifelong learning in terms of some veriables. *Anthropologist*, 21: 439-449.

Williams van Rooij S 2009. Scaffolding project-based learning with the project management body of knowledge. *Computers and Education*, 52: 210-219.

Worthington RL, Whittaker TA 2006. Scale development research a content analysis and recommendations for best practices. *The Counseling Psychologist*, 34: 806–838.