WEB BASED PROJECT MANAGEMENT EDUCATION IN STUDENT POPULATION

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Abstract

Contemporary trends in project management through web-based application tools on the market contribute to more efficient and effective implementation of projects regarding budget, time and scope. In most cases on the Serbian market, choosing the right project management tool is a time-consuming and costly tedious process. On the other hand, appropriate people recruitment with project management competencies, especially with web-based project management knowledge, is directly related to software selection and methodology which will be applied in the company. The bridge that connects two sides particulary influences the education model and competencies improvement in student population. The research was conducted among student population in master studies at the Faculty of Organizational Sciences, University of Belgrade, on a sample of 60 respondents. Key results imply that adequate education in project management improves later project results and performances. Theoretical and practical implications will be discussed.

Keywords: project management; web-based knowledge;

INTRODUCTION

Project management is aiming to take advantage of available planning and control methods in order to establish an efficient project realization. However, the success of project realisations depends on a huge number of factors including the knowledge and skills of project managers (Saracevic et al, 2012).

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On the other side, IT development and especially Internet development are the sources of various available professions and thus creating standards and processes that help people to manage their tasks successfully. Regarding this, web project manager got an important role in the team, but this has to be followed by appropriate software and methodology. Furthermore, it is directly related to software selection and methodology which will be applied in business.

According to present researches, the project manager must modify the existing key competencies, such as Pedagogical, Management, Technical and Social ones, and develop new ones based on knowledge management to be successful in managing this web 2.0 e-learning project (Palacios-Marqués et al. 2013; Pavlovic et al., 2018). In addition, using web-based construction project management system is in cross-region project coordination and monitoring (Wong and Zhang, 2013; Todorovic et al., 2013; Bjelica and Toljaga, 2013).

During the last few years, the researches have been more focused of youth education within the field of web-based project management. Kim, in his study, observed the differences in analysis between students in high and low proficiency groups after they participated in a Web-based project (Kim, 2010). The main conclusions are related to students' approach, and most of them showed positive attitudes toward collaborative education during the Web project. On the other hand, there is example of Calculus using a student-centred web project, whereby the group project improved the student education and developed their learning experience as well (Ang et al., 2016) Such projects as a part of various social networks are increasingly frequent, and therefore participants who want to gain knowledge from project management discipline acquire more networking capabilities. The group of authors who analysed students' usage of social media shared the same opinion that extra-curricular education is connected with a social network (Scholtz et al., 2017).

The students mostly use social networks and platforms such as Wikipedia (the sixth most visited website in the world), Skype, bulletin boards, text messaging and Facebook that help them adapt learning management systems (LMS) and allowing for the same experiences in the academic milieu.

Additionally, among web engineering students the Blackboard Learning Management System (BLMS) platform is popular which gives them access for participating in mini lectures, examinations, assignments, and classroom discussions and activities. Ucol-Ganiron concluded that development and implementation of a web-enhanced course in Project Management coupled with the use of classroom multimedia instruction, active and cooperative learning aimed to facilitate the teaching-learning process compared to the traditional whiteboard instruction (Ucol-Ganiron, 2013).

Focusing on Serbia, we are of the opinion that choosing the right project management tool is a time-consuming and costly tedious process. However, if the government invested in educated professionals who would be more familiar with the major principles of web project management, the process of project realisation would be easier. The main aim of the paper is to show how adequate students' education about web project management can improve future project results and performances. The survey was conducted among students of Master studies at the Faculty of Organizational Sciences in Belgrade, Serbia.

The following consists of seven parts. The first part of the paper includes introduction. The second part displays previous achievements in the field of web project management with a special focus on education. After theoretical part of the research, elaborate results are shown in the discussion part. The end of the paper involves a conclusion.

WEB BASED PROJECT MANAGEMENT

Web-based project shows the process of the project on the website, but on the other side it has a lot in common with the traditional project. The common thing for all of them is the fact that they all have a common goal: the project has to be finished in the time and led to the end successfully. In the literature, the process of realization is usually called life cycle phase. The life cycle phases include project defining (project plan development, monitoring and realization, as well as defining of risk type for every phase); the planning of project (including defining of time and volume of the project); project management (referring to resource management, cost

management, quality level, project communication as well as risk and realization management); and evaluation of project (Elba, 2018).

As it is evident the project is constituted of several tightly connected phases and each phase realisation depends on the other one's. The primary step of every single project is the development of project plan and control, that is one of the project manager's biggest responsibilities. It seems that project managers prefer prospective learning and active sharing of knowledge (Pemsel and Wiewiora, 2013).

However, as we previously said, IT development and digital transformation introduced a wide range of new professions within different fields, such as project management as well. Nowadays, we have been witnessing the emerging of numerous professions that have improved project realisation. Hence, the path of realisation is presently much shorter because web project is more aggressive and includes the possibility of numerous parallel actions throughout the project itself.

Table 1: Web-based project vs Assembly-Line Project

Project elements	**Web-based project**	**Assembly-line project**
Development schedule	Shorter and more aggressive	Set in stones and take a longer
Development style	Tends toward parallel development streams and interactive development	Tends to be more linear
Project management skill set	Needs to be broad including range disciplines and skills as applied to the web	Can be more confined to time, cost and quality management
Communication	More interpretation and education needed	Lines and terms of communication more clearly defined
Pricing	No standard pricing models for Web projects	More accepted and recognised pricing structure
Clients	Understand the medium and its parameters less well	Are more used working on these projects
Team roles	The project manager is not the main point of client contact	The project manager is usually main client contact

Source: Ashley, (2001).

It is evident in the table that web projects require special knowledge and skills so the project management role is extremely important in the education of young professionals. The group of authors which analysed what kind of factors have the biggest influence on the efficiency of the web development process for student learning concluded that the project leader's leadership, group members' previous experience, personal skill overlap, motivation, communication method, time pressure, and learning curve factor had the most important influence among the students (Kong et al, 2016).

In the following part of literature review, we will display the results of present researches that will be useful for the other countinuing of the course of this topic and making conclusions about web project management applying on student education.

Web Project Management in Education

Molinillo, Aguilar-Illescas, Anaya-Sánchez, and Vallespín-Arán (2018) analysed the influence of social presence, interactions (student-student and teacher-student) and emotional engagement on active learning within the context of social web-based collaborative learning (SWBCL) among students from two universities. They concluded that social presence and teacher-student interaction have a positive influence on students' active learning, both directly and indirectly, through emotional engagement.

In accordance with education development, Kenny et al. suggested a hybrid model of delivery the results and feedback provided should support virtual classrooms which gains more collaborative projects and experience exchange (Kenny et al., 2013).

Organisational units called project management office (PMO) are often in charge of implementing a web-based project management system. In practice, some difficulties arise in the application of such systems. Pemsel and Wiewiora emphasize a few issues in this process: PMO do not truly understand project managers' knowledge distribution requirements; project manager seems to favour prospective learning and active sharing of knowledge (Pemsel and Wiewiora, 2013) Initiate transferring and sharing tacit knowledge is directly related with trust which is followed by critical

success factors such as motivation, leadership capabilities, business strategies and organizational capabilities (Saini et al., 2018).

Table 2: Previous researches on the topic of the impact of web-based project management in education

Name, Year	Topic	Aim	Results
Kim, 2010.	Student Perceptions of Web-based Project for Language Learning.	The author investigates affective and linguistic factors of the Web-based project in an English course for two-year college students in Korea.	They made a conclusion that: 1. a student-centered approach with the web project had a positive influence on the linguistic as well as the affective domains of the survey in learners of both proficiency levels; 2. the most students showed positive attitudes toward collaborative learning during the web project via both survey and in-depth interview.
Unal, 2018.	Effect of the web project-based presentation of a mathematics unit on student success and students' opinions on the project process	The aim of the paper is to show how project-based teaching has an impact on the student success.	It was concluded that the web-based presentation of a mathematics unit appropriate for project-based teaching has a positive effect on student success, but students experience problems in reaching information sources in the process of project studies conducted in group, performing group studies, and in time management in the process of personal project studies
Molinillo, Aguilar-Illescas, Anaya-Sánchez, Vallespín-Arán, 2018.	Exploring the impacts of interactions, social presence and emotional engagement on active collaborative learning in a social web-based environment	This study offers important contributions to the study and practice of active learning in a SWBCL environment	Social presence and teacher-student interaction have a positive influence on students' active learning, both directly and indirectly, through emotional engagement

Name, Year	Topic	Aim	Results
Palacios-Marqués, Cortés-Grao, Carral 2013.	Outstanding knowledge competencies and web 2.0 practices for developing successful e-learning project management.	The paper is aiming to display the importance of web 2.0 practices in developing e-learning project management.	They concluded that the project manager must modify the existing key competencies (Pedagogical, Management, Technical and Social ones) and to develop new ones based on knowledge management to be successful in managing this web 2.0 e-learning project.

Source: Author's

METHODOLOGY

Measurement scale

This particular study uses project management modules for project web access (PWA) assessment used and validated by Microsoft (2010), including 7 components that were examined: Portfolio selection and analytic, Resource management, Financial Management, Time and task management, Collaboration, Risk and issue management, Business intelligence and reporting. 5-point scale used for data collection contained the following answers: "1 - very dissatisfied", "2 - dissatisfied", "3 - moderately satisfied", "4 - satisfied", "5 - very satisfied". Cronbach's alpha coefficient for PWA scale is 0.89, which is a good result for internal consistency (under 0.7).

Sample and procedure

The survey was conducted during the period from February to June 2015, at the Faculty of Organizational Sciences, University of Belgrade, including Management course students. The sample is based on the master students and consists of 30 men (50.0%) and 30 women (50.0%) of 22-35 years of age. Table 3 shows the characteristics of the students involved in the research.

Table 3: Sample characteristics

Characteristics	n (%)
Sex	
Male	30 (50.0)
Female	30 (50.0)
Enterprise type	
Micro and small	22 (37.7)
Medium	10 (16.7)
Large	28 (46.7)
Status	
State scholarship	40 (66.7)
Self-financing	20 (33.3)
Employment status in PM role	
Yes	35 (58.3)
No	25 (41.7)
Project web access (PWA) usage	
Yes	30 (50.0)
No	30 (50.0)
Number of projects that their organization realized on a yearly basis	
Less than 3	7 (11.7)
Between 3 and 5	11 (18.3)
Between 6 and 10	8 (13.3)
Between 11 and 15	8 (13.3)
More than 15	26 (43.3)

Questionnaire (in online form) is used for gathering data about students and project web access implementation in their companies. Students are categorised according to PWA usage. Man Whitney test was used for comparison of two different groups in the analysis, which compares the distributions of ranks in two groups. Also, Kruskal Wallis test was used for

group comparison, in case that we have more than two groups. The findings of this research are described by two parameters - mean and standard deviation, obtaining the observed effect according to p-value ($p \leq 0.05$). Also, there are descriptive statistics in order to present results more deeply.

RESEARCH RESULTS

The purpose of the study is to examine the differences in perceptions between students employed in companies with project web access approach compared with other which implement locally project management modules. Students are categorised into two groups according to PWA usage. The number of students who applied each year on Master program Project management at the Faculty of Organizational Sciences, University of Belgrade is around 70. This research includes 60 respondents, which is 85.71% of the population.

The probability value for modules resource management and risk and issue management is not less than or equal to .05, so the result is not significant. There is no statistically significant difference in the modules usage of PWA applicants and locally oriented in mentioned categories. Other modules have a statistically significant difference in the usage of the module (Table 4).

Table 4: Comparison and statistical significance for PWA usage

	Portfolio selection and analytic	Resource management	Financial management	Time and task management	Collaboration	Risk and issue management	Business intelligence and reporting
Mann-Whitney U	213.500	328.500	282.500	306.000	318.500	369.000	290.000
Wilcoxon W	678.500	793.500	747.500	771.000	783.500	834.000	755.000
Z	-3.601	-1.850	-2.641	-2.371	-2.031	-1.236	-2.476
Asymp. Sig. (2-tailed)	.000	.064	.008	.018	.042	.216	.013

Grouping Variable: PWA

Portfolio selection and analytic module and financial management module have the highest difference between an organization with and without PWA. Research results show that the most important performances, such as financial or strategic, support the fact that more and more implementation of such systems is required (Table 5).

Table 5: Descriptive statistics for PWA groups

PWA		Portfolio selection and analytic	Resource management	Financial management	Time and task management	Collaboration	Risk and issue management	Business intelligence and reporting
Yes	N	30	30	30	30	30	30	30
	Mean	3.1667	3.3667	3.9000	3.6333	3.4667	2.9000	3.6000
	Median	3.0000	3.0000	4.0000	4.0000	4.0000	3.0000	4.0000
	Std. Deviation	1.05318	1.21721	.95953	.88992	1.16658	1.26899	.93218
No	N	30	30	30	30	30	30	30
	Mean	2.0667	2.7667	3.2667	3.1000	2.9333	2.5333	2.7333
	Median	2.0000	2.5000	3.0000	3.0000	3.0000	2.0000	3.0000
	Std. Deviation	1.04826	1.22287	.98027	1.06188	1.04826	1.25212	1.41259
Total	N	60	60	60	60	60	60	60
	Mean	2.6167	3.0667	3.5833	3.3667	3.2000	2.7167	3.1667
	Median	3.0000	3.0000	4.0000	4.0000	3.0000	2.0000	4.0000
	Std. Deviation	1.18023	1.24692	1.01333	1.00788	1.13197	1.26346	1.26446

The probability value for most of the modules is not less than or equal to .05, so the result is not significant. There is no statistically significant difference in the modules usage according to enterprise type (small and micro, medium and large companies) in mentioned categories. Specifically, Business intelligence and reporting module has only a statistically significant difference (Table 5).

Table 6: Comparison and statistical significance according to enterprise type

	Portfolio selection and analytic	Resource management	Financial management	Time and task management	Collaboration	Risk and issue management	Business intelligence and reporting
Chi-Square	5.693	.303	3.417	1.086	3.645	.998	10.105
Df	2	2	2	2	2	2	2
Asymp. Sig.	.058	.859	.181	.581	.162	.607	.006

Grouping Variable: Enterprise type

Business intelligence and reporting module have the highest difference between small and micro, medium and large organisation. The results of the research are in favour of increasing the organisation's need for a better reporting system (Table 7).

Table 7: Descriptive statistics according to enterprise type

Enterprise type		Portfolio selection and analytic	Resource management	Financial management	Time and task management	Collaboration	Risk and issue management	Business intelligence and reporting
Small and micro	Mean	2.1364	3.0000	3.3636	3.3636	2.8636	2.5909	2.5909
	N	22	22	22	22	22	22	22
	Std. Deviation	1.03719	1.15470	.90214	.90214	1.16682	1.40269	1.09801
	Median	2.0000	2.5000	3.0000	3.5000	3.0000	2.0000	3.0000
Medium	Mean	2.9000	3.0000	3.7000	3.1000	3.1000	2.6000	3.3000
	N	10	10	10	10	10	10	10
	Std. Deviation	1.37032	1.56347	1.49443	1.37032	1.28668	1.26491	1.33749
	Median	3.0000	3.0000	4.0000	3.5000	3.0000	2.0000	4.0000
Large	Mean	2.8929	3.1429	3.7143	3.4643	3.5000	2.8571	3.5714
	N	28	28	28	28	28	28	28
	Std. Deviation	1.13331	1.23871	.89679	.96156	1.00000	1.17739	1.23013
	Median	3.0000	3.0000	4.0000	4.0000	4.0000	3.0000	4.0000
Total	Mean	2.6167	3.0667	3.5833	3.3667	3.2000	2.7167	3.1667
	N	60	60	60	60	60	60	60
	Std. Deviation	1.18023	1.24692	1.01333	1.00788	1.13197	1.26346	1.26446
	Median	3.0000	3.0000	4.0000	4.0000	3.0000	2.0000	4.0000

Post hoc analysis has been prepared to determine the differences between groups in relation to enterprise type. In order to determine the difference, we used Man Whitney test for two group comparisons. Regarding the table 8, it indicates that small and micro-sized enterprises in comparison with medium-sized enterprises have the highest result for business intelligence and reporting module.

Table 8: Mean rank according to enterprise type for small and micro and medium-sized enterprises

	Enterprise type	N	Mean Rank		Sum of Ranks
Business intelligence and reporting	Small and micro	22	14.64		322.00
	Medium	10	20.60		206.00
	Total	32			

From this data, it can be concluded that business intelligence and reporting in this group is not statistically significant (table 9).

Table 9: Test statistics according to enterprise type for small and micro and medium-sized enterprises[a]

	Business intelligence and reporting
Mann-Whitney U	69.000
Wilcoxon W	322.000
Z	-1.718
Asymp. Sig. (2-tailed)	.086
Exact Sig. [2*(1-tailed Sig.)]	.100[b]

a. Grouping Variable: Enterprise type
b. Not corrected for ties.

Regarding the table 10, it indicates that large-sized enterprises in comparison with small and micro-sized enterprises have the highest result for business intelligence and reporting module.

Table 10: Mean rank according to enterprise type for small and micro and large-sized enterprises

	Enterprise type	N	Mean Rank	Sum of Ranks
Business intelligence and reporting	Small and micro	22	18.57	408.50
	Large	28	30.95	866.50
	Total	50		

From this data, it can be concluded that business intelligence and reporting in this group comparison is statistically significant (table 11).

Table 11: Test statistics according to enterprise type for small and micro and large-sized enterprises[a]

	Business intelligence and reporting
Mann-Whitney U	155.500
Wilcoxon W	408.500
Z	-3.106
Asymp. Sig. (2-tailed)	.002

a. Grouping Variable: Enterprise type

Regarding the table 12, it indicates that large-sized enterprises in comparison with medium-sized enterprises have the highest result for business intelligence and reporting module.

Table 12: Mean rank according to enterprise type for medium and large-sized enterprises

	Enterprise type	N	Mean Rank	Sum of Ranks
Business intelligence and reporting	Medium	10	17.45	174.50
	Large	28	20.23	566.50
	Total	38		

From this data, it can be concluded that business intelligence and reporting in this group is not statistically significant (table 13).

Table 13: Test statistics according to enterprise type for medium and large-sized enterprises[a]

	Business intelligence and reporting
Mann-Whitney U	119.500
Wilcoxon W	174.500
Z	-.760
Asymp. Sig. (2-tailed)	.447
Exact Sig. [2*(1-tailed Sig.)]	.503[b]

a. Grouping Variable: Enterprise type

b. Not corrected for ties.

The probability value for most of the modules is not less than or equal to .05, so the result is not significant. There is no statistically significant difference in the modules usage according to a number of projects on a yearly basis (the groups are: up to 6 projects, between 6 and 15 projects, and more than 15 projects) in mentioned categories. Specifically, Time and task management has only a statistically significant difference (Table 14).

Table 14: Comparison and statistical significance according to number of projects on a yearly basis[a,b]

	Portfolio selection and analytic	Resource management	Financial management	Time and task management	Collaboration	Risk and issue management	Business intelligence and reporting
Chi-Square	5.155	2.882	3.340	6.736	2.969	5.886	5.787
Df	2	2	2	2	2	2	2
Asymp. Sig.	.076	.237	.188	.034	.227	.053	.055

a. Kruskal Wallis Test

b. Grouping Variable: Number of projects yearly

Time and task management have the highest difference between organisations which implement up to 6 projects, between 6 and 15 projects,

and more than 15 projects on a yearly basis. The research results show that a large number of projects implemented by the organisation on an annual basis also affect time management, paying particular attention to the mentioned module within the information system (Table 15).

Table 15: Descriptive statistics according to the number of projects on a yearly basis

Number of projects yearly		Portfolio selection and analytic	Resource management	Financial management	Time and task management	Collaboration	Risk and issue management	Business intelligence and reporting
<6	Mean	2.5556	2.8333	3.2222	3.0000	3.0000	2.5000	2.9444
	N	18	18	18	18	18	18	18
	Std. Deviation	1.29352	1.38267	1.30859	1.18818	1.23669	1.46528	1.39209
	Median	2.5000	2.5000	4.0000	3.0000	3.0000	2.0000	3.0000
6-15	Mean	2.1250	2.8125	3.5000	3.2500	2.9375	2.2500	2.7500
	N	16	16	16	16	16	16	16
	Std. Deviation	.80623	.83417	.89443	.93095	1.34009	.93095	1.18322
	Median	2.0000	3.0000	3.5000	3.5000	3.0000	2.0000	3.0000
>15	Mean	2.9615	3.3846	3.8846	3.6923	3.5000	3.1538	3.5769
	N	26	26	26	26	26	26	26
	Std. Deviation	1.21592	1.32897	.76561	.83758	.86023	1.18970	1.13747
	Median	3.0000	3.5000	4.0000	4.0000	4.0000	3.0000	4.0000
Total	Mean	2.6167	3.0667	3.5833	3.3667	3.2000	2.7167	3.1667
	N	60	60	60	60	60	60	60
	Std. Deviation	1.18023	1.24692	1.01333	1.00788	1.13197	1.26346	1.26446
	Median	3.0000	3.0000	4.0000	4.0000	3.0000	2.0000	4.0000

Post hoc analysis has been prepared to determine the differences between groups in relation to a number of projects on a yearly basis. In order to determine the difference, we used Man Whitney test for two group comparisons. Regarding the table 16, it indicates that the organization with 5 or less projects on a yearly basis in comparison with an organization with 6-15 projects on a yearly basis have the same result for time and task management.

Table 16: Mean rank according to the number of projects on a yearly basis (comparison between groups: <6 and 6-15 projects)

	Number of projects yearly	N	Mean Rank	Sum of Ranks
Time and task management	<6	18	16.53	297.50
	6-15	16	18.59	297.50
	Total	34		

From this data, it can be concluded that time and task management in this group is not statistically significant (table 17).

Table 17: Test statistics according to the number of projects on a yearly basis (comparison between groups: <6 and 6-15 projects)

	Time and task management
Mann-Whitney U	126.500
Wilcoxon W	297.500
Z	-.639
Asymp. Sig. (2-tailed)	.523
Exact Sig. [2*(1-tailed Sig.)]	.551[b]

a. Grouping Variable: Number of projects yearly

b. Not corrected for ties.

Regarding the table 18, it indicates that organisation with more than 15 projects on a yearly basis in comparison with an organization with 5 or less projects on a yearly basis have the highest result for time and task management.

Table 18: Mean rank according to the number of projects on a yearly basis (comparison between groups: <6 and >15 projects)

	Number of projects yearly	N	Mean Rank	Sum of Ranks
Time and task management	<6	18	17.56	316.00
	>15	26	25.92	674.00
	Total	44		

From this data, it can be concluded that time and task management in this group is statistically significant (table 19).

Table 19: Test statistics according to the number of projects on a yearly basis (comparison between groups: <6 and >15 projects)[a]

	Time and task management
Mann-Whitney U	145.000
Wilcoxon W	316.000
Z	-2.396
Asymp. Sig. (2-tailed)	.017
a. Grouping Variable: Number of projects yearly	

Regarding the table 20, it indicates that an organization with more than 15 projects on a yearly basis in comparison with an organization with 6-15 projects on a yearly basis have the highest result for time and task management.

Table 20: Mean rank according to the number of projects on a yearly basis (comparison between groups: 6-15 and >15 projects)

	Number of projects yearly	N	Mean Rank	Sum of Ranks
Time and task management	6-15	16	17.53	280.50
	>15	26	23.94	622.50
	Total	42		

From this data, it can be concluded that time and task management in this group is statistically significant (table 21).

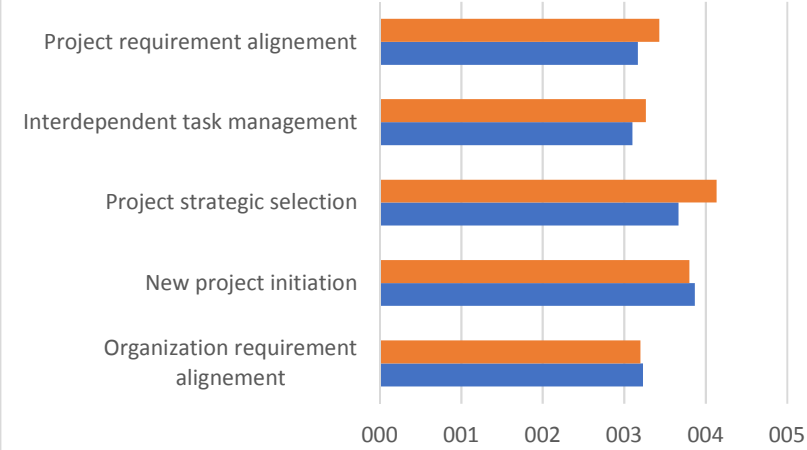
Table 21: Test statistics according to the number of projects on a yearly basis (comparison between groups 6-15 and >15 projects)[a]

	Time and task management
Mann-Whitney U	144.500
Wilcoxon W	280.500
Z	-1.968
Asymp. Sig. (2-tailed)	.049

a. Grouping Variable: Number of projects yearly

Project management documentation is often supplemented by an adequate alignment of the project's requirements, which later influences the task management and strategic project selection in the project portfolio. The results of the research have shown that organisations that have established a web-based project management approach have better results for aligning project requirements, managing activities and strategically selecting projects. On the other hand, new project implementation systems require specific competencies and capacities so that local project management orientation gives slightly better results (Figure 1). The future directions for the development of such systems should certainly focus particular attention on the implementation of the system regarding new initiatives and the alignment of organisational and project capacities.

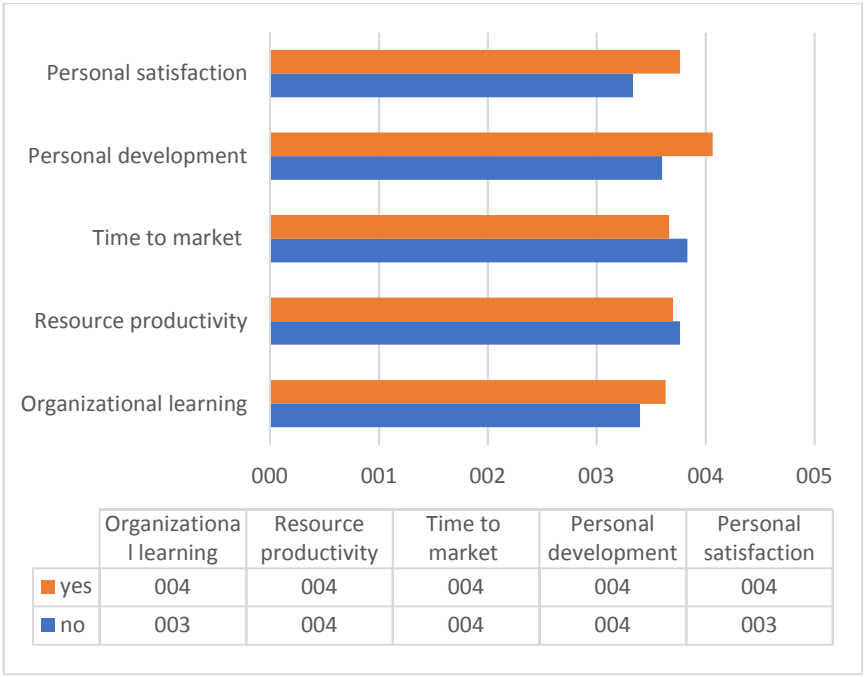
Figure 1: Strategic aspect comparison according to PWA usage



	Organization requirement alignement	New project initiation	Project strategic selection	Interdependent task management	Project requirement alignement
yes	003	004	004	003	003
no	003	004	004	003	003

Companies using project management web-based approach have a better-established knowledge management system, which contributes to a higher level of organisational learning. Also, employee satisfaction is noticeable, as well as the perception of the possibility of personal development. In this context, users of these tools certainly have a broader view of the possibilities of applying methods and project management techniques. On the other hand, sometimes these technologies are costly and require time for their implementation. Therefore, time to market and resource productivity are somewhat better when looking at the local approach (Figure 2). The future directions of development should certainly consider these two components, as well as the mechanisms for simplifying the application of such tools.

Figure 2: Project and resource aspect comparison according to PWA usage



	Organizational learning	Resource productivity	Time to market	Personal development	Personal satisfaction
yes	004	004	004	004	004
no	003	004	004	004	003

DISCUSSION

Business practices using web tools is not only noticed in the IT industry. It also includes some more traditional areas. Nitithamyong & Skibniewski (2011) indicate that web-based project management systems would enhance and transform the way in which construction-related organisations conduct business. Wong and Zhang (2013) highlight that web-based construction project management system was proved to be effective and operative in cross-region project coordination and monitoring. In addition to coordination, the concept of internationalization stands out. Moreover, the international context and the use of new technologies were also seen by students to be important aspects of the project in order to enhance project-based learning. Using web-based project management tools Hu et al. (2015) illustrate that cautiously designed contracts help to keep the projects on schedule and bring benefits to both governmental entities and the private-

sector suppliers, which offers the opportunity to track the decisions made by the private-sector suppliers during the project.

Design and construction information are the key structures for web-based information management system which enables effective collaborative environment (Anumba et al., 2008; Pavlovic et al, 2014). The applicability of the web educational system certainly contributes to content creators, where different critical factors of the project are designed, which will later be measured. For example, due to today's concepts of the game, they must be combined with educational and applicable content, such as the REED, the Patrons and Performances website project, which enable users to gain access to the complete representation of professional performance activities (drama, music, dance, acrobatics, animal acts, etc.) outside London before 1642. Various studies have discovered the affordances of 3D aspects of learning. Cho et al. found that physical and social presence are influenced not only by the figurative trustworthiness of virtual worlds but also by individual differences (Cho et al., 2015).

The development and application of a web-oriented course in Project Management combined with the use of classroom multimedia teaching, active and cooperative learning intended to simplify the teaching-learning process compared to the traditional whiteboard instruction (Ucol-Ganiron, 2013). Palacious-Marques et al. emphasize that the project manager must adapt the existing key competencies (pedagogical, management, technical and social) and to develop new ones based on knowledge management to be successful in web-based project management environment (Palacios-Marqués et al., 2013) PWA tools application mostly depends on teaching strategies, instructional methods, and technology based instruction contain the learning situation and knowledge acquisition (Ertl, 2010).

CONCLUSION

This study has shown that the application of web tools in project management contributes to a higher degree of competence for most of the areas considered, such as project portfolio management, financial management, time management, collaboration, and business intelligence.

Web-based tools are becoming increasingly popular in modern education concepts. Specifically, millennials as future creators of the business environment differently adopt the knowledge that is given to them on educational institutions. Web development process for student learning usually include the project leader's leadership, team members' previous experience, personal skill connection, enthusiasm, communication technique, time pressure, and learning curve influence (Kong et al., 2016).

Also, the intention of this study was to demonstrate that the perception of transferring knowledge to new generations takes different forms and modalities. Unal was determined that the web-based arrangement of a mathematics unit appropriate for project-based teaching has a positive effect on student success, explicitly on students experience problems in reaching information foundations in the process of project educations directed in group, which is directly related with time management in the process of personal project (Bjelica et al., 2012; Peker, 2018). Molinillo et al. (2018) suggest that social attendance and teacher-student communication have a positive influence on students' active learning, through emotional engagement within the context of social web-based collaborative learning. Future research directions should include consideration of new learning concepts, such as 3D project management learning concepts.

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