PROJECT-ORIENTED TEACHING AND GENDER-SPECIFIC DIFFERENCES IN THE PERCEPTION OF COMPETENCIES IN PROJECT MANAGEMENT

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Abstract

The present study aims to investigate the influence of project-oriented teaching and gender on individual's perception of the relevance of project management-specific competences. 59 students of the bachelor's program 'Economics, Health and Sports Tourism' at the LFU Innsbruck and the UMIT Hall were surveyed twice, once at the beginning and once after completion of the project-oriented course 'Strategic Business Management' using a questionnaire. The results indicate that the students perceive all project management-specific competences as more relevant after the course. The social and personal competencies are assessed the most important, followed by technical competences, which are also considered to be very relevant. Context competences, on the other hand, are considered less relevant by comparison. Further, the results show that there are gender-specific differences in the assessment. Female participants tend to rate almost all competencies higher in terms of their relevance. In particular, women consider social and personal competencies as well as technical competences to be significantly more important. This study offers an insight into the perception and assessment of competences. Both the insight into which competencies are considered relevant and which differences exist between individuals should serve the further development of teaching methods as well as the organisation and conception of seminars.

Keywords: *project management, project-oriented learning, relevance perception, gender-specific differences, assessment of competences*

1. INTRODUCTION

1.1 Increasing importance of projects and project management-specific competences

A project can be defined as a sequence of unique, interdisciplinary, complex, and connected activities that have a specific objective which must be completed by a specific time in accordance with specification (Wysocki 2019). It is characterised by the uniqueness of the condition as a whole (DIN 2009). Due to the relatively simple initiation and high adaptability, projects are increasingly used in different companies and branches and are therefore becoming more important (Becker & Hofmann, 2010). Projects enable flexible and rapid action in an increasingly diverse and fast-paced environment (Pfetzing & Rhode 2009). It is estimated that employees and managers will be more and more involved in projects and spend a large part of their time in project teams in the future (Heyse & Erpenbeck 2009). In an increasingly project-oriented world, collaboration is becoming a particularly relevant issue, as project work will be carried out in and between more and more company departments and organisational units (Boss & Larmer 2018). Dynamic adaptation processes, which are becoming indispensable for companies, will presumably drive further intensification and implementation.

Due to the increasing importance of projects, effective, efficient and value-added project management is becoming a critical success factor as well as an increasingly crucial key competence (Jungmann, Kühn & Nimsch, 2010). Project management contains the entirety of leadership-relevant contents for the handling of projects in order to achieve the project goals (DIN 2009). It requires a multitude of professional and interdisciplinary competencies which can be subdivided into technical and methodological competencies, social competencies, decision-making competencies and application competencies (Patzak & Rattay 2014). Another possibility is the classification into the context competences, such as the handling of regulations and strategies, personal and social competencies, for

example, communication or teamwork, and technical competences (IPMA 2015). Future-oriented study programs should support the acquisition of these competencies and integrate appropriate courses and teaching methods which can meet the requirements resulting from the growing importance of projects and project management.

1.2 Project-oriented teaching at universities

Increased demand for qualified people leads to the necessity to offer or expand more courses to impart the necessary competencies in project management (Stöhler, Förster & Brehm 2018). In many universities, project management is already part of the curriculum of a large number of study programs (Stöhler 2017; Liebehenschel 2013). The connection of projects with other courses is particularly widespread in order to effectively link and strengthen theoretically conveyed content with practical expertise and project-specific knowledge (Stöhler 2018). Thus, the involvement of projects moreover helps to strengthen the practical relevance of study programs (Kruse 2009).

Project teaching and project-oriented teaching are popular methods and forms of teaching that are geared to work in projects. Project teaching must meet various characteristic requirements, such as situational orientation, social learning or interdisciplinarity (Gudjons 1984). If some of these characteristics cannot be fulfilled due to certain restrictions, one no longer speaks of project teaching, but project-oriented teaching (Gudjons 1998). Thus, project-oriented teaching is less strict concerning the requirements and is therefore used more frequently. Nevertheless, the orientation towards projects to impart project management-specific competencies remains the same. It is rather the question of how realistic the fulfilment of all requirements necessary for project teaching is. In most cases, this will not be possible, which is why project teaching is also described as an unattainable ideal (Hänsel 1988). Irrespective of the teaching form and method, the integration of projects in the curriculum supports the professional and interdisciplinary qualification and enables the development of necessary competencies for successful project management.

1.3 Perception of the relevance of competences and gender-specific differences

An important aspect of university teaching is the identification of important aspects and relevant competencies. Particularly at the beginning of study programs and new learning contents, recognition of the importance of partial competences is an essential step for further development, as it offers the opportunity to set priorities and learning objectives as well as to acquire or develop competencies for which there was too little time in the courses.

The perception of the relevance of different competencies may vary considerably both according to the disciplinary context (e.g. management, behavioural sciences) and according to personal characteristics, like gender (Lizio & Wilson 2008). Referring to the disciplinary context, students' perception of the relevance of competences may vary depending on how important they consider them to their expected professional or disciplinary identity (Lizio & Wilson 2008). For example, a management student may assess business related competencies, such as accounting more relevant than students from other disciplines. Gender may be another influencing factor in this respect. In line with a traditional gender role perspective, one possible argument would be that women value interpersonal competencies higher, and men value problem-solving abilities higher (Lizio & Wilson 2008; Bergen & Williams 1991). From a contemporary status or role-based perspective, one may argue that students would evaluate competences more in terms of anticipated work roles than in terms of gender (Lizio & Wilson 2008; Deaux & Major 1987).

Studies to investigate gender-specific differences already exist for leadership competencies. A survey of 369 managers on leadership, cooperation and remuneration showed that women consider social-communicative competences more relevant, while men consider activity-oriented abilities more important. (Bischoff 2010). A further study with a total of 862 participants from different management levels also shows significant differences in the assessment of the relevance of specific competencies. At all levels of management, women generally valued personal skills more highly than men, especially normative-ethical issues (Krispel 2017). Another study shows that the leadership of women is more socially sensitive and the leadership of men is more result-oriented (Ainsworth & Ainsworth).

The studies mentioned deal with leadership and management in general. In addition, there are also studies specifically focused on project management. The work of Duong and Skitmore (8) identifies interpersonal communication, teamwork and influence and sensitivity as important competencies in project management and shows by existing studies that women are better at it. Further studies specifically focused on project management found differences between men and women (Rodríguez et al. 2017, Chipulu et al. 2014, Karch 2012), with women being more oriented towards social and interpersonal aspects.

1.4 Research Objective

The growing importance of projects and the increasing implementation of project management in the curricula of many study programs lead to the necessity of ongoing evaluation and investigation of the influence and development of project management-specific forms of learning. The focus of this study is to investigate the influence of project-oriented learning and gender on student's perception of the relevance of project management-specific competencies. Hence the following research questions arise:

RQ 1: Do students perceive project-management-specific competencies more relevant after participating in project-oriented courses?

RQ 2: Are there gender-specific differences in the perception of the relevance of project management competencies?

The results are used to investigate whether project-oriented courses can highlight the relevance of competences and how to take gender-specific differences into account to enable effective and efficient learning processes. Thus, the present study is intended to serve as a basis for possible further developments of project-oriented courses as well as to contribute to a critical discussion of the forms of teaching and methods used.

The remainder of the paper is organised as follows: Section 2 gives an overview of competences in project management. Section 3 includes the research method, design and procedure. Section 4 presents the data analysis and the results. Section 5 contains the discussion and conclusion.

2. PROJECT MANAGEMENT COMPETENCES

Several organisations such as the International Project Management Association (IPMA), the Project Management Austria (PMA) or the Project Management Institute (PMI) are developing standards for defining quality and listing the necessary competencies for successful project management. Various models and approaches have been developed, such as the ICB (IPMA Competence Baseline) or the PM BOK (Project Management Body of Knowledge), which contain competencies and serve as a basis for regulated qualifications and certifications (Jungmann, Kühn & Nimsch 2010; IPMA 2015).

This study uses the ICB 4 (Individual Competence Baseline) of the IPMA (International Project Management Association), and the PMA (Project Management Austria) to investigate relevant competencies (IPMA 2015). ICB 4 is a generic model of relevant competencies, and there is a general validity for all sectors and industries, and although the individual competencies may differ in their presence depending on the project area, they are all relevant for every project (IPMA 2015). It contains a total of 28 competencies which are divided into the three areas 'Perspective', 'People' and 'Practice'. The area 'Perspective' covers all topics, methods and techniques concerning the interaction of individuals with their environment. The area 'People' includes social and personal competencies which an individual needs in order to successfully participate in or lead projects. These are mainly communicative and interactive skills. The term 'Practice' covers technical skills, i.e. specific methods such as process planning or cost accounting. Table 1 describes all 28 competencies of the ICB 4.

Context Competence ('Perspective')	
Strategy	Understanding strategies, visions and missions and aligning project management with them
Governance, structures and processes	Coordinate projects with the rules of the organisation and the organisational processes
Compliance, standards and regulations	Observe all kinds of regulations and rules
Power and Interests	Recognise power potentials, influences and interests of all persons involved and use them for the benefit of the project
Culture and values	Recognising different cultures and values and integrating them in project management
Personal and Social Competence ('People')	
Self-reflection and self-management	Understand and reflect on one's behaviour and influence in the project; Set personal goals and review progress
Personal integrity and reliability	Clear, consistent, reliable and responsible behaviour in project management
Personal Communication	Communicate effectively and efficiently
Relationships and Commitment	Building personal relationships and ensuring good collaboration
Leadership	Lead people according to the situation and in an exemplary manner
Teamwork	Develop efficient teams and recognise group dynamics
Conflicts and crises	Recognising and managing conflicts and crises
Versatility	Promoting creativity, versatility and innovation
Negotiation	Negotiate according to the situation in order to reach satisfactory agreements
Result orientation	Focus on goals and results
Technical competence ('Practice')	
Project design	Know and integrate project goals, resources and stakeholders
Requirements and goals	Identify and integrate stakeholder expectations and requirements
Scope of services and delivery objects	Estimate the content and scope of the project and understand and control the scope of services
Schedule and dates	Planning, organising and coordinating project schedules
Organisation, information and documentation	Design and manage projects as a separate organisation and collect and document information
Quality	Identifying and ensuring the required quality
Costs and financing	Planning, securing and monitoring project costs and financing
Resources	Planning, securing and distributing resources
Procurement	Procure resources effectively and efficiently
Planning and control	Planning, coordination, management and controlling of the entire project management
Opportunities and risks	Identify and manage opportunities and risks
Stakeholders	Understanding and managing the social environment of the project
Change and Transformation	Be able to deal with changes in the project management in a suitable way

Table 1. IPMA Competence Baseline 4 (IPMA 2015)

3. RESEARCH DESIGN AND ADMINISTRATION

The study uses a questionnaire to investigate the influence of project-oriented teaching and gender on the perceived relevance of competences. The questionnaire collects the gender of the participants and measures the perceived relevance of all 28 competencies according to ICB 4 (see Table 1). The measurement of the relevance is carried out using six-point Likert scales ranged from 1 (completely irrelevant) to 6 (very high relevance).

The participants of the study are students of the bachelor's program 'Economy, Health and Sports Tourism' at the LFU Innsbruck and the UMIT Hall. The study is conducted as part of the project-oriented course 'Strategic Business Management'. In order to examine the influence of project-orientated teaching on the participants' perception of relevance, the survey is conducted at the beginning and end of the seminar, which allows the investigation of differences before and after participation. Both surveys are conducted in hardcopy form on the premises of the university.

Due to the organisation of the Likert scales, the gathered data can be regarded as quasi-metric, which why the study uses the arithmetic mean as a measure for central tendencies (Uhlemann 2014). The study further utilises the nonparametric tests Wilcoxon for related samples and Mann-Whitney U for independent samples to investigate significant differences. These tests are used in particular for ordinal data or in cases where interval data do not approximate a normal distribution (Janssen & Laatz 2010). Although the gathered data can be regarded as quasi-metric, the Kolmogorov-Smirnov test and the analysis of histograms show no normal distribution. The selected significance level is 0.05, i.e. if p is less than 0.05, there is a significant difference between the samples. However, if p exceeds 0.05, no significant difference exists. The data analysis is conducted with SPSS and R.

4. RESULTS AND DISCUSSION

4.1 Demographics

All students present took part in the poll. In total, 58 surveys were carried out at the beginning and 59 at the end of the course. Except for 8 missing assessments of competences in the first survey, all data could be used for evaluation and analysis. In the first survey, 62% of the participating students were female, and 38% male and the average age was 21.03 years. In the second survey, minor changes resulted from the additional data set. 61% of the participants were female, and 39% male. The average age was 21.36 years. Over 90% of the students were in the second semester.

4.2 Student's perception of the relevance of competences

Data analysis shows that students consider all competencies in the survey before and after participation to be relevant. On the mean, all competencies were in the upper range of the Likert scale. The lowest relevance can be observed in the first survey with the competence 'Culture and values' (mean = 3.36). In the second survey, the competence 'result orientation' shows the highest value of both surveys (mean = 5.56). The students assess the area 'personal and social competences" the most relevant in both questionnaires. The area 'technical competences" shows the second highest relevance followed by the area 'context competences" which is rated the least important. The direct comparison of the results of both surveys shows an increase in the perceived relevance of all competencies, which can be considered statistically significant according to the results of the Wilcoxon signed-rank test. The competence 'Requirements and Goals' shows the strongest growth in perceived relevance followed by the competence 'Result Orientation'. Table 2 summarises the results of the data analysis.

		Before participation		***After Participation***		**Δ mean**	**Wilcoxon Test**	
		N	**mean**	N	**mean**		**Z**	**p**
Context Competence	Strategy	57	**4.46**	59	**5.37**	0.92	-4.545	< .000
	Governance_Structures_Processes	57	**3.68**	59	**5.08**	1.40	-5.525	< .000
	Compliance_Standards_Rules and Regulations	58	**3.93**	59	**4.85**	0.92	-3.643	< .000
	Power_Interests	57	**3.65**	59	**4.73**	1.08	-4.44	< .000
	Culture_Values	58	**3.36**	59	**4.54**	1.18	-4.289	< .000
	Mean value total:		**3.82**		**4.92**	1.10		
Personal, social competence	Self-reflection_Self-management	58	**3.94**	59	**5.08**	1.15	-5.4	< .000
	Integrity_Reliability	58	**4.47**	59	**5.24**	0.77	-4.263	< .000
	Communication	58	**4.52**	59	**5.46**	0.94	-4.985	< .000
	Relationships_Commitment	58	**3.91**	59	**4.85**	0.93	-4.672	< .000
	Leadership	58	**4.00**	59	**5.03**	1.03	-4.697	< .000
	Teamwork	58	**4.14**	59	**5.22**	1.08	-4.925	< .000
	Conflicts_Crises	58	**4.12**	59	**5.14**	1.01	-4.989	< .000
	Versatility	58	**4.10**	59	**5.08**	0.98	-4.905	< .000
	Negotiations	58	**3.79**	59	**5.00**	1.21	-5.409	< .000
	Result orientation	58	**4.07**	59	**5.56**	1.49	-5.906	< .000
	Mean value total:		**4.11**		**5.17**	**1.06**		
Technical Competences	Project design	55	**3.91**	59	**5.14**	1.23	-5.08	< .000
	Requirements_Objectives	58	**3.53**	59	**5.08**	1.55	-5.183	< .000
	Scope of services_Delivery objects	58	**3.72**	59	**4.85**	1.12	-4.867	< .000
	Schedule_Dates	57	**4.21**	59	**5.49**	1.28	-5.612	< .000
	Organisation_Information_ Documentation	58	**3.64**	59	**4.95**	1.31	-5.651	< .000
	Quality	57	**3.89**	59	**5.24**	1.34	-5.435	< .000
	Costs_Financing	58	**4.24**	59	**4.81**	0.57	-3.101	< .000
	Resources	58	**4.10**	59	**5.05**	0.95	-4.588	< .000
	Procurement	58	**4.02**	59	**5.15**	1.14	-4.356	< .000
	Planning_Steering	57	**4.40**	59	**5.53**	1.12	-5.646	< .000
	Opportunities_Risks	58	**4.07**	59	**5.29**	1.22	-5.573	< .000
	Stakeholders	58	**3.79**	59	**4.92**	1.12	-4.958	< .000
	Change_Transformation	58	**4.00**	59	**5.22**	1.22	-5.493	< .000
	Mean value total:		**3.96**		**5.13**	**1.17**		

Table 2. Perception of the relevance of competences

4.3 Gender-specific differences

Table 3 compares the results of the responses of women and men obtained from the two surveys. Before and after participation in the course, the female participants perceive almost all competences more relevant than the male participants in the mean. In the survey before participating in the course, the female students rated the competence 'communication' most relevant. The male participants perceived the competence 'integrity and reliability" most importantly. In the survey after participation in the course, both female and male participants rated the competence 'result orientation' most relevant.

		Before Participation						***After Participation***					
		female participants		**male participants**				**female participants**		**male participants**			
		N	**mean**	N	**mean**	**Mann-Whitney U test**		N	**mean**	N	**mean**	**Mann-Whitney U test**	
						U	**p**					**U**	**p**
Context competence	Strategy	35	**4.69**	22	**4.09**	236.5	0.0055	35	**5.49**	24	**5.21**	354.5	0.2507
	Governance_Structures_ Processes	35	**3.89**	22	**3.36**	273.5	0.0535	35	**5.34**	24	**4.71**	238.5	0.0026
	Compliance_Standards_ Rules and Regulations	36	**4.06**	22	**3.73**	322.0	0.2125	35	**5.03**	24	**4.58**	307.5	0.0692
	Power_Interests	35	**3.74**	22	**3.50**	324.5	0.2948	35	**4.86**	24	**4.54**	358.0	0.3055
	Culture_Values	36	**3.36**	22	**3.36**	378.0	0.7576	35	**4.71**	24	**4.29**	326.0	0.1241
Personal_social competence	Self-reflection_Self-management	36	**3.94**	22	**3.93**	391.5	0.9408	35	**5.14**	24	**5.00**	354.5	0.2507
	Integrity_Reliability	36	**4.56**	22	**4.32**	294.5	0.0655	35	**5.43**	24	**4.96**	238.5	0.0026
	Communication	36	4.72	22	4.18	283.0	0.0306	35	5.51	24	5.38	307.5	0.0692
	Relationships_ Commitment	36	**4.00**	22	**3.77**	338.0	0.3192	35	**4.97**	24	**4.67**	358.0	0.3055
	Leadership	36	**4.19**	22	**3.68**	279.0	0.0450	35	**5.17**	24	**4.83**	326.0	0.1241
	Teamwork	36	**4.36**	22	**3.77**	239.0	0.0073	35	**5.40**	24	**4.96**	354.5	0.2507
	Conflicts_Crises	36	**4.25**	22	**3.91**	322.0	0.2018	35	**5.23**	24	**5.00**	238.5	0.0026
	Versatility	36	**4.14**	22	**4.05**	362.5	0.5581	35	**5.14**	24	**5.00**	307.5	0.0692
	Negotiations	36	**3.97**	22	**3.50**	288.0	0.0667	35	**5.23**	24	**4.67**	358.0	0.3055
	Result orientation	36	**4.22**	22	**3.82**	270.0	0.0313	35	**5.66**	24	**5.42**	326.0	0.1241
Technical Competence	Project design	35	**4.03**	20	**3.70**	288.5	0.2352	35	**5.29**	24	**4.92**	314.0	0.0701
	Requirements_Objectives	36	**3.81**	22	**3.09**	226.5	0.0041	35	**5.26**	24	**4.83**	332.0	0.1421
	Scope of services_Delivery objects	36	**3.81**	22	**3.59**	339.0	0.3296	35	**4.83**	24	**4.88**	402.0	0.7665
	Schedule_Dates	35	**4.46**	22	**3.82**	217.5	0.0032	35	**5.63**	24	**5.29**	298.0	0.0315
	Organisation_Information_Documentation	36	**3.75**	22	**3.45**	334.0	0.2830	35	**5.00**	24	**4.88**	391.5	0.6325
	Quality	35	**3.94**	22	**3.82**	336.5	0.3912	35	**5.29**	24	**5.17**	387.0	0.5752
	Costs_Financing	36	**4.50**	22	**3.82**	236.0	0.0053	35	**4.74**	24	**4.92**	409.5	0.8645
	Resources	36	**4.39**	22	**3.64**	207.0	0.0013	35	**5.09**	24	**5.00**	406.0	0.8138
	Procurement	36	**4.39**	22	**3.41**	165.0	0.0001	35	**5.17**	24	**5.13**	412.5	0.8996
	Planning_Steering	35	**4.57**	22	**4.14**	281.0	0.0473	35	**5.60**	24	**5.42**	364.0	0.3209
	Opportunities_Risks	36	**4.08**	22	**4.05**	358.5	0.5183	35	**5.46**	24	**5.04**	316.5	0.0792
	Stakeholders	36	**4.00**	22	**3.45**	284.5	0.0616	35	**5.17**	24	**4.54**	256.0	0.0068
	Change_Transformation	36	**4.19**	22	**3.68**	275.0	0.0410	35	**5.34**	24	**5.04**	341.0	0.1870

Table 3. Gender-specific differences

4. CONCLUSION

The present study investigates the influence of project-oriented learning and gender on the perception of the relevance of project management-specific competencies. The results provide empirical evidence that all competencies are assessed more relevantly after participation in the project-oriented course. Hence, it can be concluded that project-oriented teaching is capable of increasing the perception of relevance. Personal and social as well as technical competencies are assessed the most important. Context competences, on the other hand, are considered to be relatively less relevant. Based on the results, there are several opportunities for possible developments in project-oriented teaching. As personal and social competencies are considered to be particularly relevant, they should be intensively addressed and regularly reflected upon. This could not only lead to a more intensive learning process, but also to a higher motivation of the participants. In the case of technical competences, a similar effect could be achieved by integrating further teaching methods. For example, small case studies could specifically support the acquisition of individual competencies. With regard to the lower assessed relevance of context competences, their importance should be shown more clearly in project-oriented teaching. This can take place in the context of the projects or also in the form of short lectures. The second is recommended if it is not or only with difficulty possible to depict the individual competencies within the framework of the projects.

Numerous studies show that women and men differ in leadership and management style. Women regularly focus more on social and interpersonal aspects. The results of the present work indicate gender-specific differences in the perception of relevance. Women assess almost all of the 28 examined competences more relevant than men. 11 differences in the first survey and 6 differences in the second survey were statistically significant. Most of them exist in the area of 'social and personal competencies' as well as in the area of 'technical competencies'. Thus, the results can support the findings of previous studies on the existence of gender-specific differences and women's focus on social aspects. In addition, this study indicates that women also give higher priority to technical skills in some cases. Significant differences were observed, among others, in the competencies 'Schedule and Dates' and 'Planning and Steering'. This may lead to the assumption that women in project management concentrate more on time management and the organisation and implementation of processes than men. Based on the results, special attention should be paid in project-oriented teaching to a balanced composition of the project groups in terms of gender. Also, regular reflection and evaluation of competencies should be carried out.

A limitation of this study is that the participants had no or little experience in project management. The results could change as experience increases. Future studies should, therefore, involve both participants with little and participants with much experience in order to examine the influence of experience on the perception of relevance.

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