* Manuscript Critical engagement of previous research in Designs, methods and practices for research of project management

Steven Nijhuis

Critical Engagement of Previous Research

Steven Nijhuis

I wrote this chapter because I was surprised to find that previous work was used in so many different ways. I translated this surprise into a discussion paper.

There are several recent studies in competences in PM. Almost all used different sources for definitions for competence, used an own list of competences to research and chose their own route in getting responses for their research. Serving as examples, these studies show how to use (re)sources in research.

At the end of this chapter, the reader can:

• learn about the use of (re)sources in individual studies;

• increase understanding in using previously published literature on specific topics;

• compile lists of subjects for surveys for unique respondent groups.

Keywords: source usage, definitions, competences, previous research

Introduction to Competences for Project Management

Higher education for several professions, such as Information and Communication Technology (ICT), Engineering, and Construction teach their students PM for various reasons (Car, Pripuzic and Belani, 2010; Divjak and Kukec, 2008; Fernández, Cabal, Balsera and Huerta, 2010; Lebcir, Wells and Bond, 2008; McDonald, 2001; Mengel, 2008; Nooriafsha and Todhunter, 2004; Reif and Mitri, 2005; Rennie and White, 2002; Rooij, 2009; Stoyan, 2008). Crawford, Morris, Thomas and Winter (2006) state: 'Project management is offered as a significant component in a range of undergraduate and postgraduate academic qualifications, including construction, engineering and IT,' which is in line with the desire to make the higher education studies more relevant to daily work practice (Pant and Baroudi, 2008). Martin (2000) claims that PM is an important element of both management and engineering education. Chipulu, Ojiako, Asleigh and Maguire (2011) postulate that the curriculum design should be coherent.

For a paper about literature research into evidence-based competences to incorporate in curricula in higher education that prepare students for PM (Nijhuis, 2012), several studies that used a holistic view of PM were combined to create a top ten of important PM competences. These studies are used as examples to stipulate the use of (re)sources.

For the paper only studies that used a survey among professionals were incorporated. An important selection criterion was if the study allowed a differentiation in importance between the competences. A total of nine different studies were incorporated into the construct of competences needed to incorporate into a curriculum, with only one published in a scientific journal (Table 1).

<insert table 1>

Using Previous Definitions, the Definition of Competence

Throughout the years what is meant with 'competence' has changed. As noted by Crawford (2005): Competence was once a simple term, with dictionary definitions such as 'power, ability or capacity (to do, for a task etc.)' and 'due qualification or capacity, adequacy or sufficiency' to do a task. However, as Robotham and Jubb (1996) state, 'the concept of competence' has developed 'different meanings, and it remains one of the most diffuse terms in the organizational and occupational literature.' …. According to Heywood Gonczi and Hager (1992), competence can be inferred from attributes, which include knowledge, skills and experience, personality traits, attitudes and behaviours (attribute-based inference of competence).

As recognised by Crawford, it is very important to observe the definition of what you are researching. All studies supplied a definition for the term competence, except Valencia (2007) who does not use the term competence, but studies a subset: personal attributes. They all refer to other research or publications for their definition.

Golob (2002) refers to the AIPM standard: 'the concept of competency focuses on what is expected of an employee in the workplace and embodies the ability to transfer and apply skills and knowledge to new situations and environments. Competency examples … beliefs and values (Australian Institute of Project Management, 1996)'. Krahn (2005) refers to Nordhaug's (1998) perspective: 'skills and knowledge used by workers in the workplace … the approach that appears to have been used by most studies of project manager competence.' Bauer (2005) refers to yet another one: 'An underlying characteristic of an individual that is causally related to criterion referenced effective and/or superior performance in a job or situation (McClelland, 1998)'.

In the same year, Rodriguez (2005) chooses yet another: 'This term refers to the knowledge, skill, ability or characteristic associated with high performance in the workplace. A few definitions of a competency include motives, beliefs, and values (Mirabile, 1997)'.

McHenry (2008) cites from the studies by Krahn, Golob, Bauer and Rodriguez, but still chooses another definition: 'An underlying characteristic of an individual that is causally related to criterion referenced effective and/or superior performance in a job or situation (Bauer, 2005). Critical skill or personality characteristic required to complete an activity or project or required for a certain position (Ward, 2000).'

Everts (2008) cites Crawford's description from the introduction and two others Meredith (1995) and Spencer and Spencer (1993) and chooses: 'According to Van Doorn and Van der Veen (2008), competences are ultimately one of knowledge, skills and traits' (translated).

The study of Arras People is not meant to be scientifically scrutinised, but still uses a definition of competence: The OGC definition is 'Competencies are the ability to use knowledge, understanding, practical and thinking skills to perform effectively to the standards required in employment. They are identified and demonstrated through sets of behaviours that encompass the skills, knowledge, abilities and personal attributes that are critical to successful role accomplishment.'

Looking at the scientific contributions it appears confusing. Crawford builds an elaborate model to incorporate all definitions. Ultimately there are three types of competence: input, personal and output. Input comprises of knowledge and skills, personal is about the core personality characteristics and output is about one's demonstrated performance (Crawford, 2005). McHenry and Arras People add the notion of criticality to the competences. When studying competences, criticality could be important to use. It could separate the 'nice to have' competences from the 'essential' ones. An example is the most important skill in the study of McHenry for hiring project managers: basic computer skills. This is an important skill, but would it be considered critical for a project manager? Most probably not.

The definition that is used should fit the intended use. If a researcher is looking for ways to separate a normal project manager from an outstanding, it would be good to use output competences, like PM success (IPMA, 2006) or stakeholder management (www.globalpmstandards.org, October 2007). On the other hand, if a researcher is looking for ways to develop training courses for project managers, input competences would be better suited like knowledge of PM tools and techniques and/or negotiating skills. Personality characteristics would be interesting for research aimed at job selection or career advisory. A good example would be decisive or trustworthiness.

The discussion above shows that the definition of terms used in research is not to be taken lightly. Building upon previous research looks easy as soon as you find the first one to quote, but becomes difficult if you find more that are (slightly) conflicting. Do not opt for an easy way out, editors and professors are likely to know about these conflicts and will confront (or reject) work that avoids it.

Compiling a List of Competences to Research

As described previously, all researchers examined in a holistic way – not focusing on one specific aspect – what are important project competences. Although the reasons for this research differ, they all needed a list of competences as the basis for their research. In this part we look at how these researchers came to their respective lists.

Golob (2002) states: 'A literature review, internet search and discussions with academic and business professional project managers revealed no evidence of a validated survey instrument that ranked project management competencies … Therefore a survey instrument was developed using the major themes from a literature review.' While Crawford argues in 2005: 'Two widely accepted project management standards, the Guide to the Project Management Body of Knowledge and the Australian National Competency Standards for Project Management were selected as a basis for testing.' In an earlier part of her article, Crawford explains that there is 'no research reported that … performance against standards', which explains the choice for standards.

In that same year, Krahn (2005) quotes numerous researchers who have written about PM competences and concludes that there is little agreement among them and 'A Delphi Study was used in Phase 1 because the researcher sought some degree of consensus on the many skills and competencies that have been suggested as critical for a project manager to be successful'.

Bauer (2005) chooses a different route and uses a list 'developed in collaboration with the mentor, committee members, subject matter experts, and members of the focus group'.

Rodriguez (2005) decides to use the top ten found by Golob (2002) and 'the existing survey instrument was modified based on major themes found in the literature on project management competencies'.

Valencia (2007) uses the same approach, albeit on a different author: Pettersen's (1991) framework is used here as a basic guide to summarise these attributes because the process used to develop it was incredibly comprehensive (that is, he synthesised approximately 60 publications qualitatively). Petterson identified 21 traits and suggested that they could be grouped into five distinct categories, namely, problem solving, administration, supervision and team management, interpersonal relationships, and other personal qualities. Through this review, these categories were supplemented with three additional areas titled knowledge, experience and external factors.

McHenry (2008) uses validated instruments from previous authors: Recently completed dissertations (Bauer, 2005; Golob, 2002; Krahn, 2005; Rodriquez, 2005) containing their validated survey instruments were reviewed. In addition, there were various lists and questionnaires concerning project manager competencies and skills from PM authors (Baker and Baker, 1998; Kerzner, 2003; Lewis, 2000; Lewis, 2003; Portny, 2001) used as a basis for the initial pilot research survey instrument. Which is essentially the same as Everts' (2008) approach, who combines (translated) 'several previously published lists and added a few competences that did not appear in these lists but notwithstanding appear to be very important for project managers in construction, that is intelligence, discipline and integrity'.

Arras People (2010) consider the respondent and 'examined a number of competence models and created a short list of competencies which we believe are applicable to PPM practitioners and asked our respondents to indicate the top 3 competencies which they believe make them effective in their role. In order to avoid unnecessary complication for the purpose of this question we grouped methods, tools and domain knowledge into a single choice "Technical".'

The Australian Institute of Project Management (AIPM) has published PM competency standards since the early 1990s (Australian Institute of Project Management, 2010). The PMBoK (PMI, 2008) and its previous versions focus mainly on processes instead of on competences. But a competency standard is not the same as a validated instrument. And most standards do not have a strong foundation in research (Crawford, 2004). Most authors recognise that just putting together a list of competences for a survey is not scientifically sound and seek ways to improve this. Not all report this process. Some use a giant to stand on: Valencia and Rodriguez take a previous instrument and add just a little extra. Others use multiple giants like McHenry, Everts and Arras People. This gives them more freedom for design of an instrument but also puts strain on the validation of their choices.

Target Audience, Approach and Effect

In the third part we look at how the researchers approached their potential respondents. All want to do a quantitative research in order to rank the competences in order of importance.

Golob (2002) noted that a validated survey instrument that ranked PM competences was not available. So he constructed his own. He asked symposium attendees at the PMI's Annual Seminars & Symposium to fill out his survey. He received 193 respondents, 80 per cent of them project managers or managers of project managers.

Crawford (2005) does not explain how, but asked supervisors/senior management in three countries and in four application areas to rate project personnel on four dimensions. A total of 176 surveys were returned. Krahn (2005) used recommended experts for her first round, focus groups in the second round and a survey among the network (including rounds one and two) who were asked to forward it. A total of 99 respondents returned the survey of the last round, 60 per cent of them without prior involvement in the research.

Bauer (2005) collected a sample of managers currently employed with one (!) strategic business unit of a Fortune 100 aerospace corporation. Leads for survey participants were obtained through the Human Resources department of the corporation involved in the survey. Rodriguez (2005) approached the potential respondents through the PMI website after permission of PMI headquarters. A total of 500 responded.

Valencia (2007) asked two specific groups to participate in this study. First 76 project managers were invited to complete a questionnaire that assessed (the) seven personal attributes identified in the PM literature as important to project managers. Of these, 38 were willing and 25 provided usable data. The supervisors of these project managers were then asked to complete an appraisal of the project managers performance (seven of the nine asked agreed).

Everts (2008) interviewed experts and followed with an online survey, which was spread through members of the professional network of the members of the committee and participating businesses. A total of 129 project managers responded. McHenry (2008) got a lesser response. Only 53 members of Centre for Business Practices responded on his direct email requesting to fill in an electronic survey, which is in great contrast to the response to the electronic survey by Arras People (2010). They report a thousand respondents of 'project management professionals, some of whom have previously made contact with Arras People and were invited personally by email. In addition web and printed media campaigns were also used to attract PM professionals from all walks of life who have had no previous contact'.

Table 2 provides an overview of the contacting method, the number of respondents and the distribution over the main response groups.

<insert table 2>

Tips for Students

•	Be sure to provide strong argumentation for any change in the basis for research. Has a qualitative study argued that something is missing?

•	Make sure that you have an expert review of your instrument to fill any gaps.

•	If you quote a source where the basis is not definitive and needs to be changed, the approach Krahn (2005) used is quite suitable.

Tips for Supervisors

Consider the following topics in reflective sessions with your students:

• Look at the number of respondents, the distribution over functions of the respondents and the title of the publication (see Table 14.1), Which publication gives you the most confidence that the data gathering is in line with the intended purpose?

• For this discussion topic, there is no need to read more than described above. McHenry and Everts are the only two to have used previous researchers' material that are discussed in this topic, but still favour another choice than previously made. What would be a good argument for their choice? What would be a good counter-argument?

Exercises

1. There are studies about PM competences that offer a holistic view of PM and rank the competences but are published before 2000. What would be a good reason for not incorporating them?

a) referencing to a published source that criteria for PM success has changed in recent years and therefore only recent publications are used;

b) referencing to the number of quotations of the unused sources, claiming they were not referenced enough;

c) showing that their results did not match with the ones incorporated, so it would make your meta-analysis too difficult.

A is the correct answer, B and C can never be a valid reason for not incorporating research.

2. What would be the best option if you wanted to research needed competences for PM in general?

a) have a questionnaire filled in at a scientific congress about PM;

b) have a questionnaire filled in by participants on a website for project managers;

c) have a questionnaire filled in by human resource specialists in project-oriented firms.

B is the best option, but hardly a good one. Questions remain about the quality of the respondents and their representation from different subject domains. C would miss out all project managers in other firms and self-employed project managers. The scientific congress will only give you project managers that are interested in research, which is not a good representation of general PM.

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Tables and figures

Table 1 Authors of recent competence studies

Author (year)	Title	Place of Publication
Golob, M. P. (2002).	Implementing PM competencies in the workplace.	Phd, Capella University
Bauer, B. J. (2005).	A success paradigm for project managers in the aerospace industry.	Phd, Capella University
Crawford, L. (2005).	Senior management perceptions of PM competence.	*International Journal of Project Management*, 23(1)
Krahn, J. (2005).	Project leadership: An empirical investigation.	Phd, University of Calgary
Rodriguez, A. (2005).	Critical factors in hiring, promoting and designing job descriptions for strategic project managers.	Phd, Capella University
Valencia, V. V. (2007).	A project manager's personal attributes as predictors for success	MSc, Air Force Institute of Technology, Ohio
Everts, P. (2008).	Analysis of current and desired PM competences in the building industry (translated).	Master, TU Delft
McHenry, R. L. (2008).	Understanding the project manager competencies in a diversified PM community using a PM competency value grid.	Phd, Capella University
Arras People and Thorpe, J. (2010).	PM benchmark report 2010.	Published on Internet

Table 2 Method of approaching, responding to and distribution of respondents

Author	Approach	Resp.	Distribution over Functions
Golob	Giving survey in person	193	43 per cent project mgr, 37 per cent mgr of project mgrs, 17 per cent consultant and/or trainer
Crawford	Unknown	176	100 per cent mgr of project mgr
Krahn	Email snowball	99	50 per cent project mgr, 25 per cent sponsors, 24 per cent team members
Bauer	Email through HR dept	149	42 per cent project mgr, 17 per cent mgr of project mgrs
Rodriguez	PMI website	500	41 per cent project mgr, 16 per cent director/portfolio mgr
Valencia	Unknown	25 / 9	100 per cent project mgr/ 100 per cent mgr of project mgr
Everts	Email snowball	129	100 per cent project mgr
McHenry	Email direct to members	53	49 per cent project mgr, 34 per cent portfolio mgr
Arras People	Email, web, printed media	1000	88 per cent project mgr, programme mgr or change mgr, 12 per cent project support