Mapping Project Management Knowledge, Skills and Learning Needs among Postgraduate TVET Management Students: A Baseline Survey

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ABSTRACT

Context: Technical and vocational education and training (TVET) institutions in Namibia increasingly deliver reform, infrastructure, curriculum and donor-funded initiatives as projects, yet little is known about the project management capability that prospective TVET managers bring to postgraduate study. Such baseline evidence is needed if curricula are to build on, rather than duplicate or bypass, what managers already know. This study asked: What project management knowledge and skills do prospective TVET managers already possess, and what learning needs should inform the design and delivery of Project Management at postgraduate level?

Approach: A cross-sectional census survey was administered in the first week of instruction to all 85 students enrolled in the Project Management module of a Postgraduate Diploma in TVET Management (National Qualifications Framework Level 8) at a Namibian public university. Students self-rated eleven competence areas and five readiness items and selected the areas in which they required support. Using a discrepancy-based needs assessment, the data were analysed through a five-stage chain linking existing knowledge, existing skills, identified gaps, expressed learning needs, and curriculum priorities.

Findings: The cohort was mature (74.1% older than 35 years), predominantly employed in education (69.4%) and largely new to formal project management (71.8%). They rated applied, experience-based skills such as time management and teamwork (domain M = 3.63) higher than codified conceptual knowledge (domain M = 3.27), with the largest gaps against a postgraduate benchmark in the triple constraint, the project life cycle, and scope definition. Expressed needs aligned with these gaps in budgeting and cost control (80.0%) and project planning (57.6%), revealed an unmeasured need in risk management (64.7%), and signalled a shift from team membership to project leadership, while evaluation and reporting emerged as an unexpressed need. Motivational readiness (M = 4.28) exceeded current proficiency.

Conclusions: Prospective TVET managers arrive with experiential capability but without the codified frameworks needed to plan, cost, control and evaluate projects. Postgraduate Project Management should therefore be organised around the project life cycle, front-load integrated time–cost–quality control, make risk, leadership and evaluation explicit, and use students' own institutional projects as the medium of learning. The analytical chain offers a transferable method for converting baseline surveys into curriculum decisions in VET leadership programmes.

Keywords: Project management; Needs assessment; Curriculum development; Educational administration; Namibia

INTRODUCTION

Across the public and private sectors, a growing share of organisational activity is structured as temporary, goal-bound projects rather than as routine operations. This trend is described as projectification (Schoper et

al., 2018). Institutions offering technical and vocational education and training (TVET) are not exempt. Introducing a new competency-based qualification, commissioning a workshop, procuring training equipment, establishing an industry partnership, rolling out a quality management system or implementing a donor-funded skills programme are all undertakings with defined objectives, finite budgets, fixed deadlines and multiple stakeholders. Those who lead TVET institutions, including centre managers, heads of training, financial and quality managers, therefore spend much of their working lives managing projects, whether or not they have been prepared to do so. Where that preparation is weak, the consequences are well documented in African development settings, where projects frequently overrun budgets and schedules or fail to deliver sustainable benefits because of weaknesses in planning, control, stakeholder management and monitoring (Ika, 2012).

Expectations that vocational education and training (VET) will contribute to economic and social development in Africa have intensified; however, research has paid far more attention to curricula, qualifications and labour-market relevance than to the capability of the people who manage VET institutions (McGrath et al., 2020; McGrath & Yamada, 2023). In Namibia, the TVET system has been reorganised around competency-based education and training and a ten-level National Qualifications Framework (NQF), which places additional planning, resourcing and quality-assurance demands on institutional managers (Ministry of Education, 2006). Postgraduate programmes in TVET management have emerged partly in response to these demands, with project management as a standard component of the strategy.

Designing a postgraduate Project Management course for this audience raises a practical problem. Its participants are typically serving educators and public servants who have been involved in projects for years, often without formal training. They have uneven exposure to frameworks from formal professional bodies (International Project Management Association [IPMA], 2015; Project Management Institute [PMI], 2021). A curriculum based solely on those frameworks risks participants reteaching what they already do competently.

Alternatively, it may risk under-teaching what participants do not know. Thus, a curriculum built mainly from participants' stated preferences risks ignoring students' needs that are yet to be recognised. Baseline evidence that links what participants already know and can do to what they need to learn is a precondition for evidence-informed curriculum design (Altschuld & Watkins, 2014).

Baseline surveys of students are common, but they often stop at reporting percentages, for example, that knowledge is high in one area and low in another, without showing how those findings should change what is taught, in what sequence, and by what means. This article, therefore, treats a baseline survey as a curriculum needs assessment.

It reports a census survey of 85 students entering a Project Management course in a Postgraduate Diploma in TVET Management (NQF Level 8) at a public university of technology in Namibia and analyses the data through a five-stage chain: existing knowledge → existing skills → identified gaps → learning needs → curriculum priorities. The study seeks to answer the overarching question: What project management knowledge and skills do prospective TVET managers already possess, and what learning needs should inform the design and delivery of Project Management at the postgraduate level? Four sub-questions operationalise it:

RQ1: What project management knowledge and skills do prospective TVET managers report at entry, and how does this profile relate to their professional backgrounds?

RQ2: Where, and how large, are the gaps between current proficiency and the proficiency expected at postgraduate level?

RQ3: What learning needs do students express, and to what extent do these converge with or diverge from the identified gaps?

RQ4: What curriculum priorities for the design and delivery of postgraduate Project Management follow from the relationship between knowledge, skills, gaps and needs?

The article makes two contributions. Empirically, it provides a baseline profile of project management capability among prospective TVET managers in a sub-Saharan African context, a population seldom represented in the project management education literature. Methodologically, it proposes a transparent procedure for moving from descriptive baseline data to prioritised curriculum decisions, which other VET leadership programmes can replicate. Section 2 reviews the literature and presents the conceptual framework; Section 3 describes the method; Section 4 reports the results; Section 5 discusses their curricular implications and the study's limitations; and Section 6 concludes.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Project Management Competence and the Work of TVET Managers

Project management competence is generally understood as an integration of knowledge, skills and personal attributes that enables effective performance in project roles (Crawford, 2005). Professional frameworks formalise this integration in different ways. The IPMA Individual Competence Baseline distinguishes perspective, people and practice competences (IPMA, 2015) as key determinants of effective project performance. The PMBOK Guide identifies planning, delivery, uncertainty and measurement (PMI, 2021) as the main principles that can drive effective project performance. Both frameworks nonetheless retain a codified core, comprising scope definition, the project life cycle, scheduling, cost estimation and control, risk management and performance reporting, which practitioners are expected to master.

Project management scholarship, however, has questioned whether this codified core is sufficient. The field needs reflective practitioners who can handle complexity and social processes, not trained technicians who apply procedures (Winter et al. 2006). Conversely, Pinto and Winch (2016) trace how research has unsettled the normative, tools-based conception of project management in favour of a broader project management. Thomas and Mengel (2008) and Ramazani and Jergeas (2015) similarly found that conventional training emphasised tools and techniques at the expense of the leadership, contextual and interpersonal capabilities that practitioners need. For curriculum designers, the implication is not that codified knowledge is unimportant but that it must be integrated with judgement and leadership in real contexts. However, project management scholarship still questions whether this codified core is sufficient.

Winter et al. (2006) argue that the field needs reflective practitioners who can handle complexity and social processes. This means technicians trained only to apply procedures may be ineffective in the 21st performance-oriented project management environment. Conversely, Pinto and Winch (2016) trace how research has unsettled the normative, tools-based conception of project management in favour of broader management project. Thomas and Mengel (2008) and Ramazani and Jergeas (2015) similarly found that conventional training emphasised tools and techniques at the expense of the leadership, contextual and interpersonal capabilities that practitioners need. For curriculum designers, the implication is not that codified knowledge is unimportant but that it must be integrated with judgement and leadership in real contexts.

These debates have particular force for TVET managers. Their projects are embedded in public institutions, are frequently funded by government or development partners, and are accountable to multiple stakeholders, including learners, employers and regulators. Ika (2012) contends that development projects in Africa often fail not because of a lack of technical tools.

Instead, the main reasons include weak planning, unrealistic time and cost estimates, and inadequate monitoring and evaluation. Other reasons include a poor fit between project designs and local institutions. Digitalisation adds further demands as project teams increasingly coordinate their work through digital platforms (Marnewick & Marnewick, 2020). TVET managers therefore need both command of the codified core and the capacity to lead projects within complex institutional environments.

Experiential and Codified Knowledge among Adult Professional Learners

Postgraduate TVET management students are adult professionals. Andragogy holds that such learners are self-directing, draw on a substantial reservoir of experience and are motivated by learning that is immediately relevant to their work (Knowles et al., 2020). Eraut's (2004) analysis of workplace learning helps explain what that experience likely contains. Much workplace learning is informal and tacit: it develops situated capabilities such as coordinating with colleagues, meeting deadlines and solving immediate problems, but it seldom produces the codified, transferable concepts through which such activity can be analysed, planned and improved. Therefore, this adult professional learner population comprises an asymmetric profile. It combines adult learners with a relatively strong applied capability grounded in experience with weaker command of the formal constructs that professional frameworks codify.

A second consideration concerns the kind of evidence available at baseline. Self-assessment is a practical way to capture learners' starting points, but its accuracy varies with learners' familiarity with the domain being assessed (Brown et al., 2015). People with limited knowledge of a domain may lack the very knowledge required to recognise their limitations (Kruger & Dunning, 1999). For experienced professionals new to formal project management, high self-ratings in familiar areas may therefore partly reflect unfamiliarity with the more demanding standards formal frameworks set, a possibility that must be kept in view when self-reported baselines are interpreted.

Needs Assessment as a Bridge between Baseline Evidence and Curriculum

Altschuld and Watkins (2014) and Witkin and Altschuld (1995) define a need as a discrepancy between a current state (what is) and a desired state (what should be). They treat the systematic identification and prioritisation of such discrepancies as the basis for programme decisions. Two sources of evidence are commonly distinguished as normative and expressed needs. Normative needs are inferred by comparing current performance with a standard, while expressed needs are articulated by learners themselves.

The two do not always coincide. Where they converge, priorities are relatively uncontested; where they diverge, the divergence is informative, pointing either to needs that learners have not yet recognised or to demands that a standards-based analysis has overlooked. Borich's (1980) model for training needs assessment makes a related point by weighting competence discrepancies by their perceived importance rather than relying on either dimension alone.

Research argues that a needs assessment becomes curriculum design only when educators coherently connect expected learning outcomes to activities and assessment tasks (Biggs et al., 2022). In TVET competency-based systems, alignment means connecting outcomes to skills that students can adequately demonstrate and perform (Malan, 2000). This means that the first step of identifying students' needs and turning them into priorities is not merely a ranking exercise of ideas. It requires deliberate, expert decisions about sequencing, emphasis and conducting robust pedagogy.

Conceptual Framework: From Knowledge to Curriculum Priorities

Taken together, the study adopts the analytical chain shown in Figure 1. Existing knowledge refers to codified concepts and frameworks of project management. Existing skills refer to applied, process-oriented capabilities that can be developed through experience. Comparing both with a postgraduate standard yields identified gaps, which represent normative needs.

Students' selection of areas requiring support provides expressed learning needs. Reading gaps and expressed needs together allow each need to be classified by its degree of convergence, and this classification, conditioned by students' motivational readiness, informs curriculum priorities for both design (what is taught and in what sequence) and delivery (how it is taught and assessed).

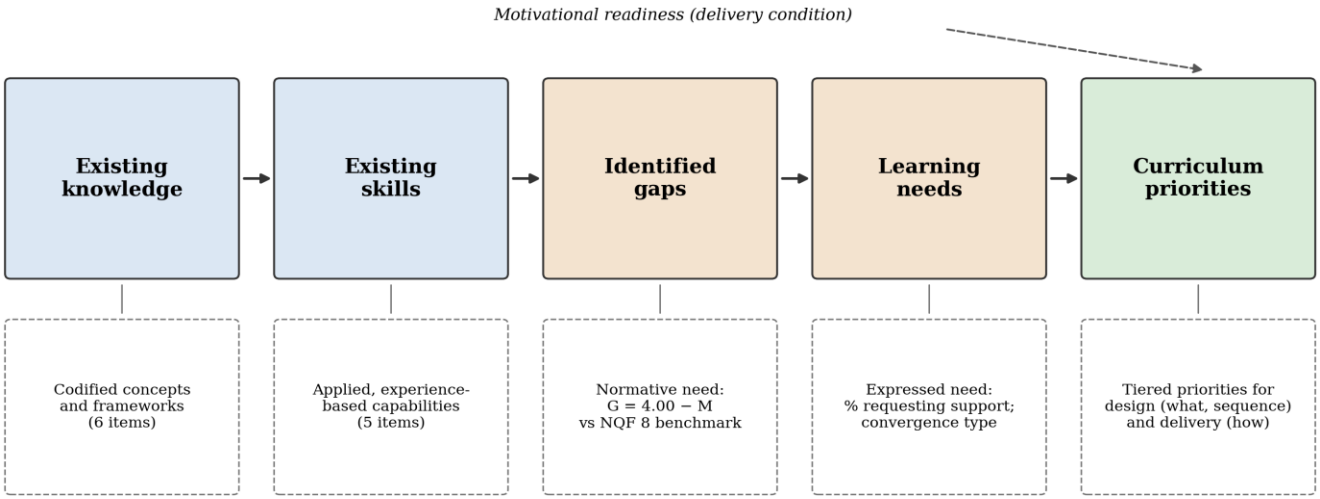

Figure 1: Analytical chain linking baseline evidence to curriculum priorities (researchers' own illustration)

The chain depicted above is deliberately cumulative. Skills are interpreted in relation to the knowledge that makes them transferable. To which gaps have meaning only against a stated standard. Whereas expressed needs are interpreted in the light of gaps, priorities reflect both, rather than either alone.

Gaps in the Literature

The study is motivated by three gaps reviewed in the literature. The first gap is that research on project management education tends to concentrate on engineering, business and information technology in the Global North. Meanwhile, TVET managers and African higher education settings are rarely represented. Second, much of this research evaluates outcomes after instruction rather than capability at entry. This situation leaves curriculum designers with limited evidence for pre-course decisions. Third, baseline studies seldom show how their findings translate into curriculum priorities. This study addresses all three by examining prospective TVET managers in Namibia at entry and by making the translation from evidence to priorities explicit.

METHODOLOGY

Research Design

The study involved a quantitative, cross-sectional baseline survey design (Creswell & Creswell, 2023). The discrepancy tradition guided our understanding of a curriculum needs assessment (Altschuld & Watkins, 2014). The study aimed to describe students' starting points before instruction could change them, and to use the findings to inform the course design and delivery.

Context and Participants

The study took place in a public university of technology in Namibia. Specifically, the study involved Postgraduate Diploma in TVET Management students enrolled in the Project Management course. The programme prepares serving and aspiring managers for leadership roles in TVET and related institutions. At NQF Level 8, graduates are expected to apply specialised knowledge to complex problems with a high degree of autonomy and responsibility (Ministry of Education, 2006). The researcher used a census approach: all 85 students enrolled in the course were invited to participate, and all 85 submitted valid responses. Because of the small number of students, the researchers used a census sampling technique to collect data. The researchers chose this technique to describe this cohort rather than to estimate parameters for a wider population (Cohen et al., 2018).

Instrument

The study developed a structured questionnaire. Section A collected demographic information, including gender and age. Section A also collected professional information, including highest qualification, employment status, sector of work, year of study, prior formal study of project management and reasons for choosing the institution. Section B used a five-point scale (1 = very low, 5 = very high) to rate students' knowledge of project management areas. The eleven areas represented the main content of professional frameworks (IPMA, 2015; PMI, 2021) at a level of description accessible to students without formal training. Section C collected motivation and learning readiness information using a five-point agreement scale. Section D asked students to select the project management areas where they most required instructional support. Multiple selections were permitted. Internal consistency, estimated with Cronbach's alpha, was high for Section B as a whole ($\alpha = .95$, 95% bootstrap CI [.92, .96]), for its conceptual knowledge ($\alpha = .93$) and applied skills ($\alpha = .93$) domains, and for Section C ($\alpha = .92$, 95% CI [.85, .95]). Corrected item–total correlations in Section B ranged from .66 to .84, and .74 to .85 in Section C. No item deletion would have raised any coefficient by more than .01. Because coefficients above about .90 can signal item redundancy or a strong general factor (Taber, 2018), the implications of the high Section B value are considered in the Limitations section.

Data Collection

We administered the questionnaire online early in the course, with responses received in two main sessions. We received the first responses on 25 March 2026 (n = 35) and 7 April 2026 (n = 41), and the second, between 26 March and 12 April 2026 (n = 9). Participation was voluntary, no identifying information was collected, and responses were not linked to assessment.

Data Analysis

Data were analysed in Python using the pandas and SciPy libraries. Likert-type ratings were treated as ordinal for frequency distributions and, following common practice in educational research, as approximately interval for calculating means and standard deviations (Norman, 2010; Sullivan & Artino, 2013). The analysis then followed the five stages of the conceptual framework.

Screening identified three respondents who gave identical ratings to all sixteen scaled items. Because excluding them changed no substantive result (the domain means, for example, became 3.26 and 3.64), all 85 responses were retained. Three sets of inferential analyses supplemented the descriptive statistics. We tested differences between the conceptual and applied domain means with a paired-samples t-test, corroborated by a Wilcoxon signed-rank test, with Cohen's d_z as the effect size. We tested differences between students with and without prior formal study of project management with Mann–Whitney U tests, with the rank-biserial correlation (r_{rb}) as the effect size. We also used the Mann–Whitney U tests to assess whether expressed needs converged with gaps at the individual and cohort levels; we compared ratings on each related competence item between students who did and did not select the corresponding support area.

Stages 1 and 2: Existing knowledge and existing skills

We grouped the eleven Section B items d into two analytical domains using Eraut's (2004) distinction between codified and experience-based knowledge. The conceptual knowledge domain comprised six items on the discipline's concepts and frameworks: the meaning of a project, the project life cycle and phases, project objectives and scope, the triple constraint of time, cost and quality, the roles of a project manager, and project evaluation and reporting. The applied skills domain comprised five items related to capabilities that are exercised and developed in everyday professional work: planning tasks and activities, managing time and deadlines, working in a project team, communicating project ideas, and solving problems during implementation. We grouped all items phrased as self-rated knowledge into an analytical classification rather than a psychometrically validated structure. It tests whether the asymmetry anticipated in this study is present.

Stage 3: Identified gaps

We calculated items of perceived proficiency gaps for each item as $G = 4.00 - M$, where M is the item mean. We used 4.00 to represent a high rate of proficiency expected of an NQF Level 8 programme graduate. The graduates are expected to apply project management knowledge autonomously. We classified gaps as follows: large ($G \geq 0.75$), moderate ($0.40 \leq G < 0.75$), or small ($G < 0.40$). The benchmark is a practical method for ordering and comparing gaps that reduces reliance on externally validated standards, and, where available, the proportion of students rating themselves at 1 or 2 was examined alongside it.

Stages 4 and 5: Learning needs and curriculum priorities

Expressed need was measured as the percentage of students selecting each support area and classified as high (≥ 50%) or moderate (30–49%). Each support area was mapped to the Section B items to which it is conceptually related, and each need was classified by its relationship to the identified gaps as convergent (a high expressed need matched by a large or moderate gap), unmeasured (a high expressed need with no directly corresponding item), role-transition (an expressed need that concerns a change of role rather than a deficit in the related item), refinement (an expressed need in an area whose related item shows a small gap) or unexpressed (a moderate or large gap without a corresponding expressed need). We then grouped the needs into priority areas using the following rules. First, convergent needs with large gaps formed the foundational core. Second, unmeasured high-demand needs formed the extended core. We also identified role transition and unexpressed needs as developmental priorities. We treated small-gap areas as experiential assets to leverage and extend. Lastly, we treated motivational readiness not as a need but as a condition informing delivery.

Ethical Considerations

This study obtained institutional ethics clearance prior to data collection. Because the researcher taught the course, we anonymised the data collection instrument to minimise students' risk when answering the research questions.

RESULTS

Profile of the Cohort

Table 1 presents the demographic and professional profiles of respondents. Students were predominantly female (71.8%) and mature. About 74.1% of respondents were older than 35 years, and only 7.1% were younger than 30 years. Almost nine in ten (89.4%) were employed, most in the education sector (69.4%) or the wider public service (22.4%). About 37.6% of respondents held an Honours degree, and a Bachelor's (30.6%). Meanwhile, Master's degrees (25.9%) were the most common. Of these, four students (4.7%) reported Grade 12 as their highest qualification, reflecting admission through alternative routes or a reporting error. Most students (72.9%) were in their first year of study. Important for curriculum design, 71.8% had never studied project management formally. Career preparation and professional opportunities were the most frequently cited reasons for choosing the institution (63.5%), followed by academic excellence and specialisation (40.0%).

Table 1: Demographic and Professional Profile of the Cohort (N = 85)

Characteristic	n	%
Gender		
Female	61	71.8
Male	24	28.2
Age group		

Above 35 years	63	74.1
30–34 years	16	18.8
25–29 years	4	4.7
20–24 years	2	2.4
Highest qualification		
Doctoral degree	1	1.2
Master's degree	22	25.9
Honours degree	32	37.6
Bachelor's degree	26	30.6
Grade 12	4	4.7
Employment status		
Employed	76	89.4
Unemployed	9	10.6
Sector of work		
Education	59	69.4
Public service	19	22.4
Business	5	5.9
Other (NGO, construction)	2	2.4
Prior formal study of project management		
No	61	71.8
Yes	24	28.2

Note – Percentages may not sum to 100 because of rounding. NGO = non-governmental organisation.

The profile describes a cohort of experienced practitioners, concentrated in the education sector, for whom formal project management is largely new. This is precisely the combination for which the asymmetry between experiential and codified capability anticipated in Section 2.2 is most likely.

Existing Knowledge and Skills

Table 2 and Figure 2 below summarise our analysis of domains and their mean item counts. Table 2 specifically indicates that the overall mean across the eleven items was 3.43. This shows that the cohort's level was between moderate and high.

The domain reveals a clear asymmetry. The applied skills domain (M = 3.63) was rated 0.36 scale points higher than the conceptual knowledge domain (M = 3.27). All five applied items were rated at 3.51 or above, whereas five of the six conceptual items were rated below 3.50. The only conceptual item above that level, the meaning of a project (M = 3.58), is definitional rather than analytical.

The difference between the domains was statistically significant, $t(84) = 4.83$, $p < .001$, $dz = 0.52$, 95% CI of the difference [0.22, 0.52], and a Wilcoxon signed-rank test gave the same result ($p < .001$). The two domain scores were strongly correlated ($r = .70$). For instance, students confident in one domain tended to be confident in the other, but within that shared level, they consistently rated applied capability above conceptual knowledge.

Table 2: Self-Rated Proficiency and Perceived Gaps by Domain and Item (N = 85)

Domain and item	M	SD	G	Gap magnitude
Conceptual knowledge (Stage 1)				
Time, cost and quality (triple constraint)	3.00	1.07	1.00	Large
Project life cycle and phases	3.12	1.05	0.88	Large
Project objectives and scope	3.20	1.02	0.80	Large
Roles of a project manager	3.32	1.01	0.68	Moderate
Project evaluation and reporting	3.39	1.02	0.61	Moderate
Meaning of a project	3.58	1.04	0.42	Moderate
Domain mean	3.27	0.89	0.73	Moderate
Applied skills (Stage 2)				
Planning tasks and activities	3.51	1.06	0.49	Moderate
Solving problems during implementation	3.52	1.02	0.48	Moderate
Communicating project ideas	3.61	0.98	0.39	Small
Working in a project team	3.76	1.02	0.24	Small
Managing time and deadlines	3.76	1.00	0.24	Small
Domain mean	3.63	0.90	0.37	Small
Overall mean (11 items)	**3.43**	**0.83**	**0.57**	**Moderate**

Note – Scale: 1 = very low, 5 = very high. G = 4.00 − M (Stage 3); large ≥ 0.75, moderate 0.40–0.74, small < 0.40. Domain classification is analytical (see Section 3.5).

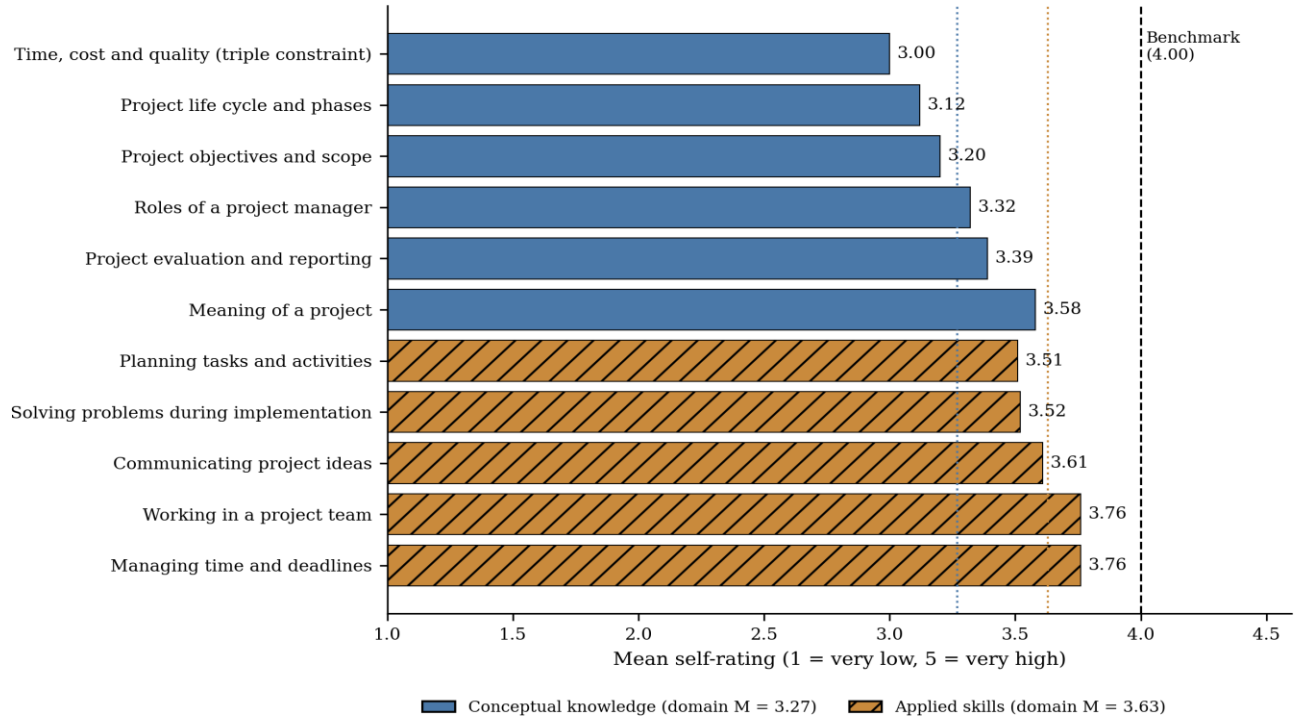

Figure 2: Self-rated proficiency by item and domain against the postgraduate benchmark (N = 85; own illustration)

As Figure 2 illustrates, the response distributions sharpen the contrast. Several features of this finding are noteworthy. For the triple constraint, 36.5% of students rated their knowledge as low or very low and only 30.6% as high or very high. For the project life cycle, 24.7% rated their knowledge as low or very low. By contrast, only 11.8% rated their capacity to manage time and deadlines as low or very low, while 63.5% rated it as high or very high. Students were thus most confident in what they do routinely at work and least confident in the frameworks through which that work is formally planned and controlled (RQ1).

Identified Gaps

Against the 4.00 benchmark (Table 2), three items show large gaps, all in the conceptual domain: the triple constraint (G = 1.00), the project life cycle (G = 0.88) and project objectives and scope (G = 0.80). Moderate gaps appear for the roles of a project manager (0.68), project evaluation and reporting (0.61), planning tasks and activities (0.49), solving problems during implementation (0.48) and the meaning of a project (0.42). Communicating project ideas, working in a project team and managing time and deadlines show small gaps. The mean gap in the conceptual domain (0.73) is roughly twice that in the applied domain (0.37). The three largest gaps are not isolated topics: scope, the life cycle and the relationship between time, cost and quality together form the conceptual spine through which projects are defined, sequenced and controlled. The baseline gap is therefore structural rather than topical (RQ2).

Gaps by Prior Study of Project Management

Prior formal study of project management was the clearest source of variation in proficiency (Table 3). The 24 students who studied the subject before rated their overall proficiency at 4.04, essentially at the benchmark. Conversely, the 61 students who had not studied the subject rated their proficiency at 3.20 ($U = 1171$, $p < .001$, rrb = .60). Evidently, the difference was largest in the conceptual domain (3.97 versus 2.99; $U = 1186$, $p < .001$, rrb = .62) and smaller, though still substantial, in the applied domain (4.12 versus 3.44; $U = 1064.5$, $p = .001$, rrb = .45). The mean conceptual gap among students without prior study was 1.01, while the triple constraint was rated at only 2.67. Therefore, the identified gaps are concentrated among the majority of the cohort that is new to the discipline. The minority with prior study begins close to the level the course aims to reach.

Table 3: Self-Rated Proficiency by Prior Formal Study of Project Management (N = 85)

Domain	No prior study (n = 61) M (SD)	Prior study (n = 24) M (SD)	U	p	r_{rb}
Conceptual knowledge	2.99 (0.81)	3.97 (0.70)	1186.0	< .001	.62
Applied skills	3.44 (0.91)	4.12 (0.69)	1064.5	.001	.45
Overall (11 items)	3.20 (0.78)	4.04 (0.62)	1171.0	< .001	.60

Note – Two-tailed Mann–Whitney U tests. Where r_{rb} = rank-biserial correlation and positive values indicate higher ratings among students with prior study.

Expressed Learning Needs and Their Relationship with the Gaps

Table 4 below highlights areas where students need the most support, with 4 in 5 students (80.0%) selecting budgeting and cost control. This was followed by risk management (64.7%) and project planning (57.6%). Team leadership (40.0%) and scheduling and time management (34.1%) were selected by moderate proportions.

Table 4: Areas Selected as Requiring Instructional Support (N = 85, Multiple Responses Permitted)

Support area	n	% of students	Level of expressed need
Budgeting and cost control	68	80.0	High
Risk management	55	64.7	High
Project planning	49	57.6	High
Team leadership	34	40.0	Moderate
Scheduling and time management	29	34.1	Moderate

Note – High ≥ 50%; moderate 30–49%.

Table 5 below maps each expressed need to its related competence items and classifies the relationship (Stage 4). Two needs are convergent. Budgeting and cost control correspond to the cost dimension of the triple constraint, which has the largest gap.

Project planning corresponds to scope definition and the project life cycle, both with large gaps, and to planning tasks and activities, with a moderate gap. At the cohort level, students' own priorities in both cases coincide with the normative analysis.

Table 5: Relationship between Identified Gaps and Expressed Learning Needs

Expressed need (%)	Related competence items (G)	Relationship
Budgeting and cost control (80.0)	Triple constraint, cost dimension (1.00)	Convergent at cohort level; demand independent of individual ratings
Project planning (57.6)	Project life cycle (0.88); objectives and scope (0.80); planning tasks (0.49)	Convergent at cohort and individual level
Risk management (64.7)	No direct item; nearest is solving problems during implementation (0.48)	Unmeasured
Team leadership (40.0)	Working in a project team (0.24); roles of a project manager (0.68)	Role-transition
Scheduling and time management (34.1)	Managing time and deadlines (0.24); triple constraint, time dimension (1.00)	Refinement
Not expressed	Project evaluation and reporting (0.61); project life cycle beyond planning (0.88)	Unexpressed

Risk management is classified as unmeasured. It attracted the second-highest level of demand, yet the instrument contained no knowledge item on risk; the nearest item, solving problems during implementation, concerns reactive problem-solving rather than the anticipatory identification and treatment of uncertainty. The strength of demand points to a need that the normative analysis could not detect.

Team leadership was classified as a role-transition need. Students rated their capacity to work in a project team highly (G = 0.24). About 40.0% of respondents requested support in team leadership, showing a moderate gap (G = 0.68) for the related role of a project manager. This need concerns moving from team membership to leading a team, not a deficit in teamwork itself.

Scheduling and time management fall under refinement needs. Managing time and deadlines showed one of

the smallest gaps (G = 0.24), yet a third of students requested support. Alongside the large gap for the triple constraint, with time as one dimension, this suggests that students distinguish between managing their own time and deadlines and using scheduling techniques to model and control the time dimension of projects.

Finally, two gaps have no corresponding expressed need. Project evaluation and reporting (G = 0.61) and the project life cycle, beyond their partial capture in project planning, are classified as unexpressed needs: needs a curriculum based only on students' requests would likely overlook.

Individual-level comparisons qualify this picture as students who selected project planning rated their knowledge of objectives and scope lower than those who did not (M = 3.00 versus 3.47; U = 649, p = .031, rrb = −.26). A similar but non-significant pattern appeared for the project life cycle (2.94 versus 3.36; p = .060). Planning is therefore convergent at both the cohort and individual level. Budgeting and cost control behaved differently. Students who selected them did not rate the triple constraint lower than those who did not (3.07 versus 2.71; p = .253). And 80.3% of students without prior study selected them, compared with 79.2% of those with it. Demand for budgeting support is thus near-universal and independent of self-rated proficiency: its convergence with the triple-constraint gap holds for the cohort but not for individual students. No other support area was significantly associated with ratings on its corresponding item (all $p \geq .24$). Nineteen students (22.4%) selected all five areas, which limits the items' discriminating power (RQ3).

Motivational Readiness

Table 6 shows a strongly positive readiness (overall M = 4.28), where students reported high motivation to learn project management (M = 4.47), understood its importance for their careers (M = 4.45), and were ready to work on practical projects (M = 4.28) and to learn through group work and collaboration (M = 4.21). Comfort with digital learning tools was lowest (M = 3.96), though still close to agreement.

Table 6: Motivational Attitudes and Learning Readiness (N = 85)

Item	M	SD
I am motivated to learn Project Management	4.47	0.83
I understand why Project Management is important for my career	4.45	0.79
I am ready to work on practical projects	4.28	0.88
I am willing to learn through group work and collaboration	4.21	0.91
I am comfortable using digital tools for learning	3.96	1.02
Overall mean	**4.28**	**0.77**

Note – Scale: 1 = strongly disagree, 5 = strongly agree.

Table 6 shows that overall readiness exceeded overall self-rated proficiency by 0.85 scale points, $t(84) = 9.16$, $p < .001$, $dz = 0.99$. This is what is known as 'readiness surplus': high willingness to learn combined with moderate current proficiency is a condition that instruction can exploit, provided that the distance between readiness and proficiency is closed through scaffolded learning rather than left to motivation alone.

DISCUSSION

Experiential Strength, Codified Weakness

The first finding answers the first part of the overarching question. Prospective TVET managers do not enter postgraduate study as novices. They report functional capability in the applied dimensions of project work, namely working in teams, managing time, communicating, and solving problems, consistent with a cohort in which nearly 90% are employed, mostly in education. What they lack is codified knowledge that integrates these activities into a managed project: a clear model of the life cycle, disciplined scope definition and an

understanding of how time, cost and quality trade off against one another. Eraut's (2004) notion of informal workplace learning suggests this asymmetry. Although experience builds individuals' work-related capabilities, it does not guarantee they can transfer and improve the concepts they learnt. This finding supports the argument that practitioners need both tools (Pinto & Winch, 2016; Thomas & Mengel, 2008) and qualifications. This cohort of students needs a combination of tools, experience, and judgement, but lacks frameworks that would let them exercise judgement systematically. The comparison by prior study reinforces this interpretation. Students without formal project management education lack knowledge, and they report the largest gaps. Students with prior study begin near the benchmark in both domains, as expected if codified knowledge comes from formal learning rather than experience alone.

Two cautions apply. Self-ratings in familiar areas may be inflated, because students who have not encountered formal scheduling or leadership models may underestimate what competent performance in those areas involves (Brown et al., 2015; Kruger & Dunning, 1999). The identified need for scheduling is consistent with this interpretation. Conversely, low ratings for conceptual items may be comparatively accurate, since unfamiliar terminology such as the triple constraint makes a lack of knowledge easy to recognise. If anything, therefore, the applied domain may understate the difference between the domains rather than the conceptual one overstate it.

From Gaps to Needs: Convergence, Blind Spots and Role Transition

The second finding concerns how students' priorities align with the normative gaps. The strongest convergence lies in the financial and control dimension of projects. While four in five students requested support in budgeting and cost control, and the triple constraint recorded the largest gap, this identifies a recognised and substantial need. It affects the administration of vocational centres in many ways. Research shows that TVET managers frequently administer public or donor funds under demanding accountability regimes. However, weak skills in cost estimation and control consistently contribute to causes of project failures in African development settings (Ika, 2012). The individual-level analysis nevertheless shows that this demand did not depend on students' own ratings of the triple constraint and was equally strong among those with prior study. Budgeting is therefore better understood as a role-driven need than a simple knowledge deficit. Meaning that, whatever their current knowledge, students anticipate that managing money is where their accountability as TVET managers will be most exposed. Divergent cases in this study tell another story. For instance, the unmeasured demand for risk management tells us that expressed needs highlight what the instrument missed. This reminds us that normative and expressed needs are complementary, not interchangeable sources of evidence (Altschuld & Watkins, 2014). Conversely, the unexpressed need for evaluation and reporting shows the opposite. Students did not request support in an area where their proficiency was only moderate, even though monitoring, evaluation and reporting are central to accountability for publicly funded TVET projects. A curriculum driven solely by student demand would underweight it.

The need for role transition deserves particular attention in a programme intended to prepare managers. Students' confidence in working in teams, combined with their uncertainty about the project manager role and their need for leadership support, describes learners who have participated in projects but have not yet led them. This transition, from participant to accountable project lead, is the professional shift a postgraduate TVET management programme is designed to support, and it aligns with contemporary frameworks and research on the people dimensions of project competence (IPMA, 2015; Ramazani & Jergeas, 2015).

Curriculum Priorities for Design and Delivery

The final stage of the chain answers the second part of the overarching question by converting classified needs into curriculum priorities (Table 7). The priorities address both design, what is taught and in what sequence, and delivery, how it is taught and assessed, and are framed to preserve alignment among intended outcomes, learning activities, and assessment tasks (Biggs et al., 2022).

Table 7: Curriculum Priorities Derived from the Knowledge–Skill–Gap–Need Chain

Priority tier	Evidence basis	Design implication	Delivery and assessment implication
1 Foundational core: life cycle, scope and integrated time–cost–quality control, including budgeting	Large gaps (G = 0.80–1.00) with convergent high needs (57.6–80.0%)	Use the life cycle as the organising spine; front-load scope definition, work breakdown structure and an integrated schedule, cost and quality baseline; teach the triple constraint as trade-off decisions rather than as a definition	Worked examples from TVET projects (e.g., equipment procurement, programme implementation); students produce a scope statement, work breakdown structure and cost baseline for a project in their own institution, with formative feedback on each
2 Extended core: risk management	High unmeasured demand (64.7%)	Dedicated unit on risk identification, analysis, response and monitoring, linked to the cost and schedule baseline	Risk register for the student's institutional project; scenario analysis of typical TVET risks such as funding delays, procurement failures and staff turnover
3 Developmental: project leadership and roles; monitoring, evaluation and reporting	Role-transition need (40.0%) with moderate gap in roles (G = 0.68); unexpressed need (G = 0.61)	Explicit outcomes on project governance, stakeholder management and team leadership; unit on monitoring, evaluation and reporting against baselines	Case analysis and role-play of leading institutional project teams; reflective leadership log; progress report against the baseline as a summative task
4 Leverage and extend: teamwork, time, communication, problem-solving	Small or moderate gaps; refinement need in scheduling (34.1%)	Avoid re-teaching; extend experiential capability into formal techniques such as Gantt charts, critical path analysis and communication plans	Structured experience-sharing and peer teaching; scheduling exercise using data from students' own projects
Differentiation: prior study of project management	Students with prior study near the benchmark (M = 4.04); students without it show a conceptual gap of 1.01	Diagnostic entry task; recognition of prior learning for students with prior study; bridging unit on core concepts for students without it	Mixed-experience groups with experienced students as peer mentors; extension tasks such as earned value analysis for advanced students
Cross-cutting: readiness and digital tools	Readiness surplus (M = 4.28); lower digital comfort (M = 3.96)	Introduce authentic tasks early; phase in project management software progressively	Collaborative, project-based learning culminating in an institutional capstone project; guided practice with digital tools

Note – Tiers follow the decision rules in the Data Analysis section.

Three design principles follow. First, sequence the course around the project life cycle. Teach them as a coherent progression from initiation and scope through planning, costing and scheduling to control, evaluation and closure. Second, teach the triple constraint as an integrated decision-making process. The gap between the triple constraint and the demand for budgeting and cost control suggests teaching cost as one dimension

of a compromise for time and quality. Use TVET cases to demonstrate that a change in one dimension forces changes in the others. Third, make risk, leadership and evaluation explicit rather than incidental, because they represent, respectively, a strongly expressed need, a role-transition need and a need students did not voice.

For delivery, the cohort profile supports a practice-integrated andragogy (Knowles et al., 2020). With most students employed in education, each student's own institutional project can serve as the medium through which the life cycle is learnt; the artefacts of each stage, namely the scope statement, work breakdown structure, schedule, budget, risk register and progress report, become assessment tasks; experiential strengths are recognised and extended rather than repeated. Gaps are notable among students without prior project management education. Thus, delivery should also be differentiated by introducing a short diagnostic task at entry to identify students who need a bridging introduction to core concepts. However, those whose prior learning can be recognised can serve as peer mentors in mixed-experience groups. For the readiness surplus, early engagement with authentic tasks is recommended. For students uncomfortable using digital tools, we argue for introducing project management software progressively with guided practice. This will help students to meet the increasing digitalisation of project work (Marnewick & Marnewick, 2020).

Beyond this course, the chain offers TVET leadership programmes to move away from baseline surveys to transparent curriculum decisions about its assumptions. Its value lies less in the specific benchmark and thresholds used here than in requiring each curriculum priority be traceable to evidence about what learners know, what they can do, where their gaps lie and what they say they need (RQ4).

Limitations

The study has several limitations that influence the conclusions. First, the data were self-reported, which may have been affected by social desirability. including calibration challenges discussed above. Future studies may use performance-based diagnostic tasks to provide a stronger baseline. Second, items were grouped into conceptual and applied domains to help facilitate analysis. The very high internal consistency of Section B ($\alpha = .95$) and the strong correlation between the domains ($r = .70$) indicate that self-ratings share a substantial general confidence component; a consistent within-person difference supports the distinction between the domains but should be validated through factor analysis with a larger sample. Third, because the data collection instrument did not include risk management and budgeting items, students could not rate the importance of the two areas, precluding the weighted discrepancy analysis proposed by Borich (1980). Fourth, the 4.00 benchmark is a heuristic: a different benchmark would change the magnitude of the gaps, but not their rank order. Fifth, the study's context and population were limited to a single-cohort census from a single institution. The inferential tests describe this cohort rather than generalising to a wider population. We also acknowledge that we made several comparisons without multiple testing correction. Further, the support needs item had limited discriminating power because a fifth of students selected every area.

CONCLUSION

This study asked what project management knowledge and skills prospective TVET managers already possess and what learning needs should inform the design and delivery of Project Management at postgraduate level. The answer is that they bring applied, experience-based capability in teamwork, time management, communication and problem-solving, but lack the codified frameworks, namely the project life cycle, scope definition and the integrated control of time, cost and quality, through which projects are planned and governed, and these gaps are concentrated among students without prior formal study of the discipline. Their expressed needs align with these gaps in project planning, show a near-universal, role-driven demand for budgeting and cost control, reveal an unmeasured need in risk management and point to a transition from participating in projects to leading them, while evaluation and reporting emerge as a need that students do not voice. Postgraduate Project Management for TVET managers should accordingly be designed around the life cycle, front-load integrated time–cost–quality control, make risk, leadership and evaluation explicit, and be delivered through students' own institutional projects, so that their experience becomes the medium for formal learning rather than a substitute for it.

Future research should triangulate self-ratings with performance-based diagnostics. Future research may also include importance ratings to enable weighted needs analysis. Moreover, validate the knowledge–skill structure psychometrically, including examining the role of prior study with larger samples. Additionally, repeat the assessment at the end of the course to establish whether a curriculum designed from the chain closes the gaps it identified. Furthermore, replication in other member states of the Southern African Development Community (SADC) would show whether the profile reported here is specific to Namibia or characteristic of TVET managers more widely in the region.

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