

Article

Education Stakeholders' Viewpoints about an ESD Competency Framework: Q Methodology Research

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Abstract: Teachers are considered key drivers of the education for sustainable development (ESD) agenda. They play a critical role in ensuring the attainment of sustainability goals, yet require early opportunities to acquire the necessary knowledge, skills, and attitudes, which will enable them to foster ESD. Therefore, this study documented the development and evaluation of a framework consisting of the core competencies that pre-service teachers need to achieve ESD in Qatar. Framed by complexity theory, the competency framework was developed into a Q-sample, which was then evaluated by multiple education stakeholders, including teacher educators, professional development specialists, ministry specialists, and teachers. The results of the Q-analysis indicated six diverse viewpoints and revealed a lack of overarching consensus statements among the viewpoints. Several statements were also considered controversial as different participants revealed contrasting views in regard to their importance for pre-service teachers. Implications for practice using the competency framework as a dynamic communication and reflection blueprint for implementing ESD are discussed.

Keywords: competencies; ESD; SDG; complexity theory; pre-service teachers; Q methodology; Qatar



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1. Introduction

According to UNESCO's Education for Sustainable Development (ESD) agenda, education is a goal in itself and a means for achieving the other Sustainable Development Goals (SDGs) by 2030. Future teachers are considered powerful change agents “who can deliver the educational response needed to achieve the SDGs” ([1], p. 17), particularly through SDG4 pertaining to the provision of quality education. In recent years, public policies and national schemes have addressed the need for teacher preparation programs (TPPs) to join the efforts toward the successful adoption and implementation of ESD. Specifically, in the context of this study, sustainable development is a core element of Qatar National Vision 2030 [2]. These international and national movements target several quality indicators for successful ESD initiatives for teachers [3], which bear a remarkable resemblance to findings from research on the characteristics of quality TPPs [4]. These quality indicators are meant to enhance the efficacy and outcomes of teacher preparation towards ESD [5,6], thus ensuring that pre-service teachers and their future students act in sustainable ways.

While several studies have documented evidence for the success of some TPPs in preparing effective and committed teachers to implement ESD [7–9], other studies point to disappointing outcomes, as pre-service teachers fail to enact practices and strategies that promote learning, well-being, and development for all students [10,11]. These disappointing outcomes have generally been attributed to a missing link between pre-service teachers' learning and their classroom practices, as they do not necessarily enact the practices taught during their TPPs, nor do they always engage in innovative teaching practices that challenge deficit views of education [10,12]. According to Ell et al. [10], these disappointing results call for teacher education research to preserve a holistic and non-linear approach in

examining the impact of preparation on desired outcomes. Such an approach takes into account the simultaneity of influences on teacher preparation, including the individual development of teacher candidates (i.e., their knowledge, beliefs, skills, dispositions, and identity), as well as the complex and multi-layered contexts in which future teachers are prepared to implement ESD [5,7,12,13]. In other words, it may be best to see the challenge of teacher preparation, which is directly associated with teachers' readiness to implement ESD, "as a complex, overlapping systems problem" ([11], p. 114).

Framed by complexity theory, this study presents the development and evaluation of a pre-service teacher competency framework as an emergent structure for implementing ESD in Qatar. Throughout the process, we accepted the notion that how pre-service teachers ought to be prepared and evaluated against a definite set of criteria is inherently contested and subjective [14]. In effect, we recognized teacher education as a complex system in which simultaneous interactions among actors and elements occur to influence the way pre-service teachers learn to teach in concordance with ESD goals [4,5,15]. We further accounted for the agency of multiple actors in the teacher education system who have the capacity to collaborate and engage in dialogue that will culminate in a competency framework for ESD [1,3,5,16,17]. Therefore, we identified local education stakeholders' perceptions of the development and evaluation of the framework. The consensus of education stakeholders on a blueprint of this sort will therefore enable them to collectively evaluate the effectiveness of their programs in implementing ESD and raise expectations for pre-service teachers to be ESD-ready [1,5,15,18–20].

The extant literature designates competency frameworks, often called professional standards, as one component of an accountability system for teacher preparation [8,21]. For the most part, specifically in countries influenced by neoliberal, market-based approaches to education reform, several researchers claim that there has been an absence of democratic discourse in their construction [6,8,22,23]. Therefore, the purpose of the current study was to provide a rich and differentiated interpretation of the kinds of teacher competencies considered important for the implementation of ESD from the perspectives of differently positioned teacher education stakeholders (i.e., teacher educators, college-based professional development (PD) specialists, school-based teachers, and ministry specialists).

For this study, we employed Q methodology, an approach used for the systematic study of subjective perceptions [24]. The previous research has adopted different research methodologies in the development of competency frameworks for pre-service teachers, few tailored specifically toward ESD [3–5,7–9,13]. While these approaches provided a useful starting point, the significance of the Q methodology lies in its power to engage multiple education stakeholders in the construction of a competency framework and its evaluation. Q methodology can further reveal coherence or dissonance in participants' perspectives toward a proposed competency framework.

The following research question was our starting point: What do education stakeholders perceive to be the core competencies, which pre-service teachers should acquire to implement ESD? We contended that education stakeholders may have different perceptions on the way TPPs should integrate sustainable development competencies, which pre-service teachers will need to acquire before their graduation. The proposed competency framework derived from this Q study is believed to contribute to equipping pre-service teachers with the desired competencies to achieve ESD. Using the findings of this study, future work on engaging education stakeholders in constructive dialogue around pre-service teachers' competencies for implementing ESD, while using the framework as a dynamic communication and reflection tool, may thereafter become possible.

2. Theoretical Framework

2.1. Teacher Preparation Programs as Complex Systems

Many scholars and researchers have examined complexity theory in relation to teacher education in what has been termed a "complex turn" in the field while acknowledging its potential and challenges as a conceptual and theoretical framework [10,12,16,17,25,26]. In

essence, complexity theory is particularly concerned with understanding learning, change, and growth, which constitute the main goals of TPPs [10], which are aligned with the SDG4 of ensuring “inclusive and equitable quality education” and promoting “lifelong learning opportunities for all” ([1], p. 18). It is a theory that challenges the pervasive worldview built on scientific reductionism and contends that complex phenomena cannot be properly understood from the properties of its parts [17]. Dominant thinking regarding TPP outcomes remain relatively linear and are process-product driven, yet such views do not take into consideration their nested nature and the notion that a multitude of factors are at play, resulting in emergent phenomena rather than predictable outcomes [14]. In this respect, research that only explores the parts of TPPs has resulted in a fragmented understanding of the way they work [6]. Rather, there is a need to understand the interactions and products of interconnecting parts, which prompt the system to emerge, adapt, and self-organize [17].

As complex learning systems, TPPs are embedded in multiple and varying contexts and communities, including individuals, schools, school-university collaborations, professional development contexts, and wider society, which are also complex dynamic systems [14,25]. These embedded systems do not operate in isolation nor are they ordered hierarchically, and each system is nested within, and simultaneously interacts with, other systems to produce patterns of practice and unexpected outcomes, described in terms of emergence [14]. These emerging patterns are not random, but they are unpredictable, which suggests why many of the outcomes from teacher education are variable and sometimes even disappointing [10].

The extant literature indicates that competency work should be at the heart of ESD, despite a clear lack of knowledge about the competencies needed for pre-service teachers to achieve ESD [27,28]. There is thus, a need for a comprehensive blueprint that will support pre-service teachers in understanding sustainability in all its dimensions [28], that is by first acknowledging the complexity surrounding ESD and addressing its holistic nature through TPP design, implementation, and evaluation [27]. Accordingly, we adopted a complex systems-thinking to explore multiple education stakeholders’ perceptions of the core competencies for pre-service teachers to become capable of implementing ESD in their future classrooms. The development of these competencies during this initial stage of teacher education is critical, as it sets the stage for their continued development in this area [28].

2.2. A Competency Framework as an Accountability Mechanism

Whether considered benchmarks for teacher professionalism or cornerstones of education reform, professional competencies reflect major trends in education with their emphasis on measurement and accountability [21]. Driven by economic globalization and its pervasive neoliberal ideologies, a rise of performance cultures across the globe has resulted in the continued imposition of externally mandated expectations [27,29], used as indicators of teacher quality [19]. Although variations exist across countries, a substantial policy emphasis on teacher competencies has generated debate over their intended and unintended consequences, leading some to consider them as carrying out dichotomous agendas; as a way to achieve quality in teachers and the teaching profession, and as a way to control teachers’ practices and challenge their professional autonomy [21,30]. Apparently, the debate over the place of professional competencies for teachers has not been resolved, as some researchers still question their necessity, deliberate their content and formats, and consider alternatives [29,31].

In the attempt to resolve the controversy over professional competencies, one alternative includes the distinction between taking a regulatory versus developmental approach [27,28]. The construction of competency frameworks from “within” the profession, as opposed to those which regulate from “above” [30], has been proposed as a viable solution. In similar countries to Qatar, such as Australia, the USA, and the UK, professional competencies have been proposed by governments and are used as regulatory frameworks, particularly in regard to licensing and certification procedures. In other countries, such

as Canada (Alberta and Ontario), Hong Kong, and Singapore, they are used as tools for teachers to reflect on their professional learning needs and gain professional autonomy over their work [29,31].

Taking a developmental approach has thus been commended as offering opportunities for local education stakeholders to participate in determining accountability mechanisms specifically tailored to their particular contexts [32]. Cochran-Smith [6] denotes that such measures are grounded in trust and capacity building, and are deliberately designed to produce useful information for program improvement. The ESD literature corroborates with this developmental approach and offers general guidelines for the knowledge, skills, partnerships, and actions needed for pre-service teachers to achieve ESD generally, and SDG4 specifically [27,28]. In this case, education stakeholders concerned with assessing the outcomes of TPPs towards ESD would acquire a clear direction of what to expect pre-service teachers to accomplish in terms of content knowledge, pedagogical practices, and professional dispositions [1,5,7,21]. This blueprint of competencies can provide a consistent and transparent approach for clarifying goals, promoting quality teaching, evaluating pre-service teacher learning, and examining program progress toward ESD [5,27,32].

As the future holds many changes in social, economic, political, and technological arenas, teacher competencies will need to reflect these changes [17]. Rather than only reflecting common competencies, including knowledge of curriculum, educational theory and assessment, knowledge of subject-specific methods and strategies, and the capability of designing plans and practices [32], they must also account for evolving skills in areas such as digital literacy, socio-emotional learning, global citizenship, and social activism [21], and further encompass the environmental, social and economic components of ESD [27,28]. Lastly, introducing such frameworks early on within TPPs gives pre-service teachers the opportunity to see them as part of their professional learning [27], and supports them in becoming aware of the SDGs and their connections to education [15]. Addressing ESD in TPPs is considered a key element for developing the awareness, attitudes, and behaviors of the future generation of students toward sustainable development [28].

2.3. The Qatari Teacher Education Context

The College of Education at Qatar University is the only accredited teacher preparation program in Qatar. In 2016, the college obtained licensing from the National Council for Accreditation of Teacher Education (NCATE), a US-based professional accreditor. Incorporated within this licensing system are several sets of standards that outline the principles and foundations of teaching practices common to all subject areas and grade levels. In addition to these standards, teachers in government schools are required to meet the Qatari National Professional Standards for School Teachers (QNPSST) for registration and licensing [33], including pre-service teachers from the college who are automatically placed in Level 2 (or Proficient Level), rather than considered at Level 1 (or Entry Level). To scale up to Level 3 (or Advanced Level), teachers are required to show evidence of “excellent” ratings on the QNPSST for at least three consecutive years of full-time employment.

Several concerns over adopting foreign standards have been raised in extant literature. Similar to the adopted standards, the QNPSST were imported from western educational experts without serious consideration of the cultural fit [23,34]. The adoption of foreign standards is inherently problematic, as it lacks the careful consideration of the context and ownership of such standards, making it more difficult for local stakeholders to understand, support, and evaluate them. Moreover, adopting such accountability systems purportedly designed of and for the profession does not ensure their acceptance. Cochran-Smith [6] denoted that they may be perceived as being grounded in a deep mistrust of teacher educators, use standards that do not derive from stakeholder participation and fail to account for the strengths, commitments, and needs of local TPPs and their community partners. Further, given the imported nature of such standards, the issue of context sensitivity should be raised, as “it would be deeply erroneous to assume that ‘what works’ in one context would also be effective in a different context” ([22], p. 116).

Therefore, while it may be important for TPPs to show evidence of quality teaching through foreign standards, more important is consensus from local education stakeholders, who can provide useful insight about their expectations for pre-service teachers [17]. That pre-service teachers have the ability to address different SDGs and potentially influence future generations to adopt these SDGs is also an equally important consideration.

While top-down frameworks include competencies, which address the implementation of ESD, they were not initially designed to do so. Particularly since sustainable development is a core element of Qatar National Vision 2030 [2], ESD has been placed high on the nation's policy priorities for its education system. With the aim of reducing its dependency on oil and gas revenues, QNV aims for a diversified knowledge-based economy through strengthening its educational provisions and outcomes. Reiterated in national public policy is the notion that well-prepared teachers can provide high-quality education, which will ultimately lead to the achievement of SGD4 [15].

3. Methods and Materials

3.1. Research Design

The current study adopted Q methodology (henceforth Q) to obtain a rich and differentiated understanding of diverse education stakeholders on the competencies they deemed important for the successful preparation of pre-service teachers for the implementation of ESD in Qatar. According to complexity theory, multiple education stakeholders and their individual, relational and contextual backgrounds may potentially influence their perspectives. Therefore, Q methodology provides a useful approach for capturing the complexity of a competency framework for achieving ESD.

Q methodology was developed by William Stephenson, a British physicist-psychologist, which emphasizes the systematic investigation of subjectivity [24]. It is used typically to examine the complexity of individual beliefs, perceptions, and views [35,36], and has been used in education research for some time as a robust, systematic methodology [37]. In compliance with methodological suggestions by Watts and Stenner [24], we followed these five steps (1) Q set development, (2) participant selection, (3) data collection (Q-sorting), (4) data analysis, and (5) factor interpretation. These steps are explained in some detail as follows:

3.2. Step 1 Q Set Development

For the current study, this step constituted the development and evaluation of the competency framework. Initially, we analyzed existing frameworks from several countries across the globe (UK, Australia, US, Canada, Hong Kong, Singapore, and Turkey), in addition to studies, which included compilations of competencies developed for teacher education and those with a focus on ESD [3–5,7–9,13,38,39]. When such frameworks existed for teachers at multiple career stages, we were careful to examine those competencies written for pre-service teachers only. We compiled an initial set of competencies divided into the three dimensions of what teachers should know, do and value for the implementation of ESD. In selecting the competencies, these criteria were followed: (1) consisted of a fairly representative set across most frameworks, (2) incorporated notions from the science of learning and development, (3) encompassed recent developments in the ESD arena, (4) revealed realistic expectations for pre-service teachers, and (5) alluded to both teacher and student standards in the Qatari context.

To include local education expertise in the development of the competency framework, we engaged in discussions and deliberations with a stratified sample of four groups of stakeholders, namely, teacher educators (N = 3), PD specialists (N = 4), ministry specialists (N = 3), and teachers (N = 3). The initial list of competencies, which consisted of 235 statements was reduced into 40 statements after three rounds of discussions with each group. This process consisted of eliminating redundancies, grouping similar concepts together, and keeping in line with ESD key elements. As shown in Table 1, the statements were further confirmed to belong to one of the three constructs of what teachers should know,

do, and value. That is, the criteria and dimensions of the framework were not completely pre-determined a priori, but emerged from deliberations about local commitments and goals, as well as the SDGs from the ESD framework. The statements were then translated into Arabic and both languages were used in the sorting activity.

Table 1. Q set development.

Dimensions of Pre-Service Teachers' Competencies	Number of Statements
(K) What teachers should know about ESD	5
(D) What teachers should do to implement ESD	25
(V) What teachers should value in ESD	10

3.3. Step 2 Participant Selection

To explore diverse perceptions of the competency framework, we invited another stratified sample of 44 education stakeholders from teacher educators (N = 11), PD specialists (N = 11), ministry specialists (N = 9), and teachers (N = 13) to participate in the Q study. We aimed for a strategic sample and identified groups of education stakeholders who have been involved in teacher education, generally speaking, at the ministry, school, and university contexts. First, we contacted specialists from the MOEHE who had worked on the QNPSST, as they had engaged in the development a set of teacher competencies and would have ideas on the requirements for pre-service teachers. Second, we created a list of all partner schools that had previously worked with pre-service teachers from the College of Education during their practicum experience. We then recruited teachers who had at least three years of experience, previously mentored pre-service teachers, and taught one of the following subjects: English, Arabic, Mathematics, Science, or Social Studies, which are considered the core subjects in the Qatari education system. Third, we targeted teacher educators from the College of Education who had taught methods of teaching, research methodology, and general education courses. We also ensured that the teacher educators had been teaching in Qatar for no less than three years to ensure their familiarity with the education system. Individuals from the four groups who were willing to participate became our participants in this study, as shown in Table 2.

Table 2. Demographic data.

Group	Total Years of Experience	Gender	Nationality
Teacher educators	M = 23.3 years	F (N = 7) M (N = 3)	Jordanian (N = 3), Egyptian (N = 2), Qatari, Iraqi, British, Lebanese, Tunisian, American
PD specialists	M = 23.8 years	F (N = 9) M (N = 2)	Jordanian (N = 6), Palestinian (N = 2), Egyptian, Yemeni, Indian
Ministry specialists	M = 22.7 years	F (N = 8) M (N = 1)	Qatari (N = 8), Egyptian
Teachers	M = 10.4 years	F (N = 13)	Qatari (N = 6), Palestinian (N = 2), Jordanian, Bahraini, Syrian, Omani

3.4. Step 3 Data Collection

We collected the data for this study using a paper version of the 40 bilingual statements. The first two authors were available during the sorting activity to give directions and clarifications in response to the following question: How important are the following teacher competencies for pre-service teachers to implement ESD in Qatar? Participants were

instructed to first provide their demographic data (see Table 2). Next, they rank-ordered the statements by assigning each one a hierarchical position from “least important” (−5) to “most important” (+5) on a forced-choice, quasi-normal, and symmetrical distribution grid (see Figure 1 for an example). By applying their subjective views, participants constantly compared the relative importance of each competency, resulting in a single holistic configuration. Lastly, we instructed participants to elaborate on their decisions through a post-sorting survey with open-ended questions. Specifically, they explained their reasoning behind sorting the statements ranked as the most important and those ranked as the least important, respectively.

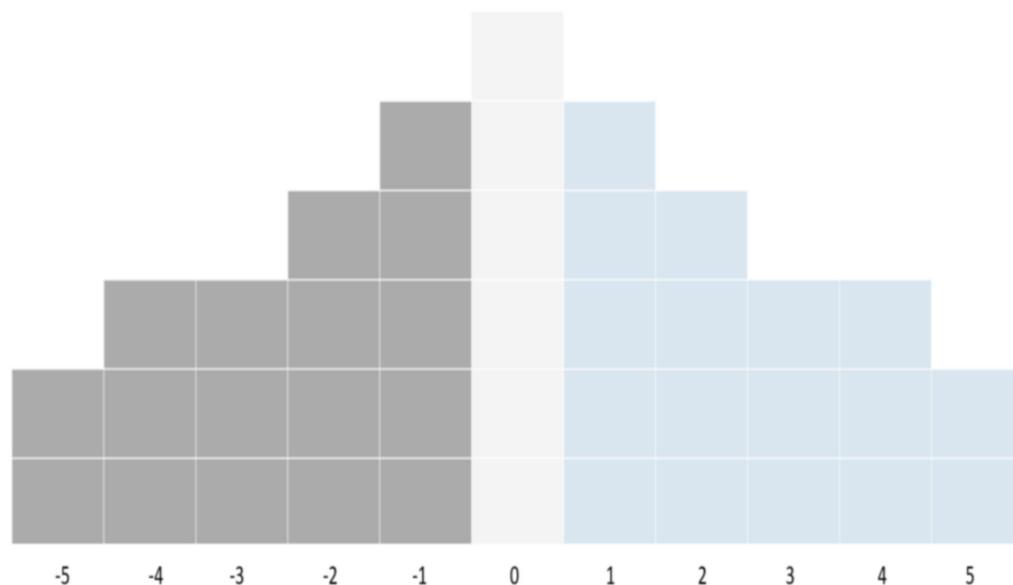


Figure 1. Q-sort distribution grid.

3.5. Step 4 Data Analysis

The data obtained from the 44 completed grids were inserted manually into an Excel spreadsheet and imported into KADE, a dedicated Q analysis software package [40]. By applying a by-person factor analysis as a data reduction technique, participants with similar sorts were grouped together, as opposed to the traditional by-variable factor analysis in R methodology. Common techniques in Q studies were used in exploring the data, namely, centroid factor extraction followed by Varimax rotation [24]. Accordingly, these techniques were used in an investigatory fashion, as we evaluated whether certain participants could be added to a factor, and chose the most informative solution for each component.

After the elimination of factors with insufficient statistical strength, we agreed that a six-factor solution was most suitable. We used statistical criteria for accepting a solution, namely, eigenvalues of >1.00 , explained variance, and at least two participants who loaded statistically significantly ($p < 0.05$) on the factor [36], as well as ensuring the corroboration between the factor solution and the post-sorting survey data. Of the 44 Q-sorts, 34 significantly loaded on only one of the factors. We excluded one sort because it was a single negative sort, despite significantly loading on factor 3. Nine confounded sorts were also excluded. Taken together, the factors explained 62% of the study variance, which is above the accepted 35–40% variance identified by Kline [41]. While the selected six-factor solution is typically above the average in Q studies [41], we concluded that it was appropriate given their representation of independent viewpoints that substantially added to the description and discussion of the competency framework.

3.6. Step 5 Factor Interpretation

For each factor, we created a single idealized Q sort, termed factor array, which was obtained through a procedure of weighted averaging of all significantly loading Q sorts.

The factor arrays represented how a hypothetical participant loading on one of the factors would rank the statements, and functioned as the basis for the abductive and iterative interpretation of the data. Table 3 shows the values assigned to individual statements in each factor. The statements are listed in descending order, with those with the most consensus (smallest Z-score variance) across the factors listed first.

Table 3. Factor values for statements.

Dim #	Statement	F1	F2	F3	F4	F5	F6	Z-Score Variance
D 19	Promote students' higher-order thinking skills	1	4	3	3	2	2	0.104
D 11	Provide active learning experiences	2	0	1	1	−2	0	0.171
D 12	Relate classroom learning to authentic local and global issues	0	1	1	0	−3d	0	0.192
D 22	Build positive relationships with students	1	4	3	2	3	0	0.192
V 33	Have empathy	−3	−4	−1	−3	−1	−4	0.2
D 30	Reflect on teaching and learning approaches	0	3	1	−1	1	4	0.212
D 27	Manage students' challenging behavior	−1	−3	−2	0	−1	0	0.213
D 24	Maintain an orderly learning environment	−1	−1	2d	0	0	−2d	0.279
D 7	Implement a variety of assessment	2	0	0	1	0	3	0.283
D 9	Give feedback to students	4	0	2	2	1	4	0.304
D 15	Use digital tools and learning technologies	2	1	5d*	1	2	−1	0.324
V 32	Have collaboration skills	−1	−1	0	−2	3	−3	0.326
D 8	Use assessment outcomes	3	0	0	2	−2	1	0.339
D 20	Encourage social interaction	−3	−4	−2	0	0	−4	0.357
D 26	Foster emotional connectedness and community	−5	−5	−3	−4	−4	−1	0.362
D 18	Make connections between disciplinary and interdisciplinary concepts	0	−3	1	−2	−3	−3	0.37
D 29	Collaborate with colleagues	−2	−1	−1	−3	1	2	0.397
D 23	Incorporate classroom management strategies	3	−2d*	4	0	1	0	0.503
D 21	Accommodate students' educational needs	2	3	4	1	−2	−1	0.546
D 25	Enable social-emotional learning	−4	−5	0	−3	2	−4	0.562
V 38	Demonstrate entrepreneurship thinking	−4	1d	−4	−4	−2	−1	0.575
V 31	Have communication skills	0	−2	2	−1	3	3	0.586
D 13	Engage students in cooperative work and self-directed learning	1	0	4	1	−1	5	0.604
V 36	Adapt to new situations	−2d*	1	2	−1	4d	0	0.609
K 5	Have knowledge of local education policies	−2	−2	−4	2d*	−5	−5	0.642
D 14	Design teaching materials and resources	0	2d	−1	−5d*	0	−1	0.718
D 17	Use verbal and nonverbal communication strategies	1	−3d*	3	−1	4	1	0.72
V 34	Engage in professional learning	−3	5d*	−2	−2	0	−2	0.78
K 3	Have knowledge of curriculum	5d	1	0	4	1	−2	0.864
K 4	Have knowledge of local culture	−2	−4	−2	4d*	−1	−2	0.885
D 10	Implement a variety of instructional strategies	4	0	5	0	−3d*	4	0.886
K 1	Have knowledge of learners	3	−1	−3	3	−4	3	1.008
V 37	Apply ethical principles	−1	−1	−3	5	4	2	1.025
K 2	Have knowledge of learning	4	2	−4d*	5	0	2	1.09
V 39	Enhance creativity	0	5d*	−1	−4	2	1	1.213
V 40	Have integrity	−1	−2	1	4	5d*	1	1.214
D 28	Participate in school-decision-making	−5	4d*	−1	−2	−4	−5	1.281
D 16	Build on students' prior knowledge	1	3	0	3	−5d*	5	1.304
D 6	Design lesson/units	5d*	2	−5	−5	−1	−3	1.708
V 35	Have teacher leadership skills	−4	2	−5d	−1	5d*	1	2.035

(d) indicates statements that significantly distinguished the particular viewpoint at $p < 0.05$; (d*) indicates significance at $p < 0.01$; (K) what teachers should know, (D) do, and (V) value; (F1) factor 1, (F2) factor 2, (F3) factor 3, (F4) factor 4, (F5) factor 5, (F6) factor 6.

We first began with a within-factor interpretation by examining the patterns emerging from the factor arrays. Specifically, we carefully considered the distinguishing statements, which significantly differentiated the factor compared to the other factors, in addition to the highest- and lowest-ranked statements within each factor. These statements were particularly highlighted in the description of the results, supported by the post-sorting responses. This description was further enriched with an across-factor interpretation, whereby we looked for consensus statements, which cut across all the factors without having a significantly different position in any factor (see Table 3). However, for this data set, there were no consensus statements.

4. Results

In this section, we present the statistical characteristics and our interpretation of the six factors, or what we termed viewpoints, to accentuate their predominantly subjective nature. In writing the narratives for each viewpoint, we refer to Table 3 and include between parentheses the number of the statement and its assigned value for a particular factor. For example, (19; +4) refers to statement 19 with the assigned value of +4 in the specific factor array. Table 4 presents an overview of the results summarized by the number of participants loading on each viewpoint, its explained variance, the participants' group membership, and the highest- and lowest-ranked statements across the dimensions of the competency framework. We also indicated the statements that distinguished the particular viewpoints by adding a 'd' for distinguishing statements at $p < 0.05$ or a 'd*' for significantly distinguishing statements at $p < 0.01$.

Table 4. Summary of viewpoint results.

F	N	Explained Variance	Group Membership	Highest Ranked Statement	Lowest Ranked Statement
F1	17	23%	Teacher educators (N = 3)	3d (K)	28 (D)
			PD specialists (N = 9)	6d* (D)	26 (D)
			Ministry specialist (N = 3)	10 (D)	38 (V)
			Teachers (N = 2)	2 (K)	35d (V)
F2	3	7%	Teacher educators (N = 1)	39d* (V) 34d*	26 (D)
			Ministry specialist (N = 1)	(V)	25 (D)
			Teachers (N = 1)	22 (D)	20 (D)
F3	2	7%	Teacher educators (N = 1)	28d* (D)	4 (K)
			Ministry specialist (N = 1)	10 (D)	35d (V)
			Teacher educators (N = 1)	15d* (D)	6 (D)
F4	5	10%	Ministry specialist (N = 1)	13 (D)	38 (V)
			Teacher educators (N = 1)	21 (D)	5 (K)
			PD specialists (N = 1)	37 (V)	14d* (D)
			Teachers (N = 2)	2 (K)	6 (D)
F5	4	6%	Ministry specialist (N = 1)	4d* (K)	26 (D)
			Teachers (N = 2)	3d (K)	39d* (V)
			PD specialists (N = 1)	35d* (V) 40d*	16d (D)
			Ministry specialist (N = 1)	(V)	5 (K)
F6	3	9%	Teachers (N = 2)	37 (V)	28 (D)
			Teachers (N = 3)	36d (V)	26 (D)
			Teachers (N = 3)	16 (D)	28 (D)
				13 (D)	5 (K)
				10 (D)	33 (V)
				9 (D)	20 (D)

(d) indicates statements that significantly distinguished the particular viewpoint at $p < 0.05$; (d*) indicates significance at $p < 0.01$; (K) what teachers should know, (D) do, and (V) value.

4.1. Viewpoint 1: Core Classroom Practices

Core classroom practices were considered essential teacher competencies for the seventeen participants associated with Viewpoint 1. They believed pre-service teachers

should acquire knowledge of curriculum (3, +5) and knowledge of learning (2, +4), which would support designing lessons and units of study (6, +4), and implement a variety of instructional strategies (10, +4). Core teaching practices also included using assessment outcomes (8, +3) and giving feedback to students (9, +4).

In the post-sorting activity, participants provided the rationale behind their choices. For instance, as a PD specialist, Participant 3 considered “knowledge of curriculum as a requisite for designing effective lessons and units,” she added, “when teachers are the designers, they will be able to make instant adjustments inside the classroom that influence students’ learning.” Further, as “the majority of pre-service teachers graduating from the CED are recruited by the ministry,” Participant 18, a ministry specialist, “they should have deep knowledge of the national curriculum.” Lastly, Participant 38 elaborated on her choice of implementing instructional strategies, indicating that “teachers’ skills are revealed through the use of different strategies, which enables them to transmit information more effectively and support student learning.”

By contrast, participants associated with Viewpoint 1 de-emphasized the need for pre-service teachers to have teacher leadership skills (35; −4), demonstrate entrepreneurial thinking (38; −4), or participate in school decision-making (28; −5). While these three competencies are associated with teachers’ abilities to enact agency in response to contextual factors, participants revealed their awareness of certain contextual factors, which hindered teachers’ ability to enact agency in its various forms. In explaining such constraints, two ministry specialists agreed that “decisions came from the ministry, and then from the school principal, academic vice principal, and middle management,” (Participant 16), and “teachers can only make decisions related to their students, while most decisions and policies are directed toward them” (Participant 17). From a PD specialist point of view, participants focused on the developmental aspect of such competencies and indicated “pre-service teachers can’t acquire these skills from taking a course, they need experience in the schools and a lot of time” (Participant 4). In agreement, Participant 6 considered pre-service teachers’ lack of experience as a hindrance, as “they don’t yet have enough knowledge and expertise to participate in decision-making, and not all of them will acquire this competency.” Similarly, “entrepreneurial thinking,” was considered “a complex competency that can only be acquired through practice on the job” (Participant 1).

Additionally, participants deprioritized pre-service teachers’ need to foster emotional connectedness and community (26; −5). For one PD specialist, “this competency is developed instinctively through teachers’ interactions with their students, and as long as they can teach effectively, engage students, and manage the classroom well, they will also be achieving this competency” (Participant 8). Interestingly, one of the significantly distinguishing statements for this viewpoint was the value of adapting to new situations (36; −2). In interpreting this statement, the PD specialists alluded to the recent school closures as a result of the COVID-19 pandemic. Despite the shift to online learning during school closures, they contended that teachers were only required to follow new directives and implement ministerial measures, rather than find their own way of adapting to the new situation.

4.2. Viewpoint 2: Creative Minds Count

In this second viewpoint, three participants shared similar perceptions about the most important competencies for pre-service teachers to implement ESD. Distinguishing themselves from other viewpoints, they believed enhancing creativity (39; +5) and engaging in professional learning (34; +5) were two competencies necessary for pre-service teachers to acquire in order to achieve ESD in Qatar. Relatedly, they saw the need for pre-service teachers to promote higher-order thinking skills as important (19; +4). Among the distinguishing statements was the importance of participating in school decision-making (28; +4). In explaining his reasoning, Participant 13, who worked as a ministry specialist, noted that “when teachers’ voices are heard, they will have the motivation to engage in continued professional learning, and they will thus become more effective and creative decision-makers.”

This comment showed the intricate relationships among the competencies, and the need to consider their interconnectedness, rather than think of them as separate entities. This notion was further supported by Participant 31, a teacher educator, who also emphasized the interrelationships among these competencies, namely, creativity was a higher-order thinking skill that “teachers need to have so they can be creative and accommodate the needs of all their learners”.

Similar to Viewpoint 1, participants in this viewpoint also valued pre-service teachers’ design competencies; whether lessons and units (6; +2), or teaching materials and resources (14; +2). In regard to the latter, this competency constituted a distinguishing characteristic for participants in Viewpoint 2. Complimenting this competency, demonstrating entrepreneurial thinking (38; +1) was rated positively only by participants of Viewpoint 2. Again, the notion of creativity is in concordance with entrepreneurial and design thinking, which further distinguishes this viewpoint from others.

By contrast, the competencies which were deprioritized by participants in Viewpoint 2 were fostering emotional connectedness and community (26; −5), enabling social-emotional learning (25; −5), and encouraging social interaction (20; −4). In explaining their choices, two participants (13 and 31), based their rationales on the interconnectedness of several other competencies with which they rated unfavorably. For instance, the Participant 31 explained that “the relatedness between statements 21 and 22 cover those in statements 25 and 26. In choosing the least important statements, I aimed for coverage, because all the statements are in fact important for pre-service teachers”.

Another devalued competency in relation to having knowledge related to ESD was having knowledge of local culture (4; −4). According to the post-sorting responses, Participant 44, who was a teacher, believed that students required “a global education in the 21st century.” An expatriate herself, she believed “students should not be taught as though they all belonged to the same local culture. They have different nationalities and to cater to their needs, we shouldn’t restrict ourselves to the local culture only”.

4.3. Viewpoint 3: Digitally Enriched Instructional Strategies

Viewpoint 3, with two participants, revolved around the importance of instructional strategies and digital tools. The competencies with the highest values were implementing a variety of instructional strategies (10; +5) and using digital tools and learning technologies (15; +5), in addition to the competencies of engaging students in cooperative and individual learning (13; +4), and accommodating students’ educational needs (21; +4). As a package, these competencies foreground an image of teachers orchestrating diverse instructional strategies, whether teacher-directed or student-centered, and in ways that accommodate specifically to students’ educational needs.

The post-sorting responses supported this illustration, as noted by Participant 23, a teacher educator, such that “the main role of teachers lies in finding ways to ensure their students receive content and engage in learning. Teachers who can implement a wide variety of strategies can reach a diversity of students who learn in different ways.” With more of a focus on student-centered learning, Participant 19, a ministry specialist, believed that “digital tools have become a necessity in the world today. Our students are dependent on technology in their everyday lives and they need to learn how to use these tools for learning . . . Teachers need to know how to facilitate student use of digital tools as they work independently and cooperatively, and acquire research skills.” Furthermore, Viewpoint 3 also prioritized the competency of maintaining an orderly learning environment (21; +2). This competency may seem contradictory to other competencies favored by Viewpoint 3. The notion of an orderly learning environment does not necessarily support students’ engagement in cooperative and self-directed learning situations, where students may be working on various inquiry-based projects at different paces.

By contrast, Viewpoint 3 participants reported low values for certain interrelated competencies. Firstly, they did not prioritize the need for pre-service teachers to acquire teacher leadership skills (35; −5) or entrepreneurial thinking (38; −4), similar to participants

associated with Viewpoint 1. Participant 19, a ministry specialist, juggled the importance of competencies based on pre-service teachers' capabilities ahead of graduation. She also emphasized that "they need experience in school settings for such competencies to develop. Gradually, their confidence will grow as they consolidate their teaching skills and mature into experienced teachers. Their teacher leadership skills may follow at this stage without formal preparation."

Interestingly, participants in Viewpoint 3 devalued the need for teachers to design lessons and units. They considered this competency to lie within the realm of curriculum developers. As the curriculum is developed at the MOEHE, Participant 23 noted that "teachers don't need to design lessons or units because everything comes ready-made from the ministry. They need to understand the curriculum well and know how to teach lessons well." Despite these apparent dilemmas, participants were able to reason and provide rationales that made sense to them.

4.4. Viewpoint 4: Local Culture and Ethics

Five participants held similar perceptions about ESD competencies for pre-service teachers and were grouped in Viewpoint 4. As opposed to the participants associated with Viewpoint 2, they believed in the need for pre-service teachers to have knowledge of local culture (4; +4), local education policies (5; +2), and curriculum (3; +4). In the post-sorting activity, this emphasis on the local culture was associated with the characteristics of the education system, as teachers in Qatar are mainly recruited from neighboring Arab countries. According to participants of Viewpoint 4, pre-service teachers who graduate with knowledge of the local system will have an advantage over teachers who must learn about these aspects on the job. For example, Participant 35, a teacher, explained that "pre-service teachers should have knowledge about the local culture as a requisite for their knowledge of learners in this context and as a requisite for accommodating to their needs."

Another prioritized competency was pre-service teachers' ability to apply ethical principles (37; +5). For this statement, Participant 10, who was a PD specialist, emphasized teachers as "role models for their students regardless of their subject proficiency," and added, "teachers should behave ethically with their students and colleagues, and in the community." Participant 14, a ministry specialist, also highlighted the importance of ethical principles, such that "when teachers are trustworthy, loyal, honest, and proficient, they will try their best to perfect their work and perform their duties to the best of their knowledge".

However, participants of Viewpoint 4 did not prioritize the design competencies that were highly valued by participants of Viewpoints 1 and 2. In particular, designing teaching materials and resources (14; -5) was a significantly distinguishing statement, in addition to designing lessons and units (6; -5), which was also notably devalued. According to the post-survey responses, participants shared similar notions toward the design competencies as those in Viewpoint 3. They, too, highlighted the idea of teachers receiving curriculum resources and materials from the MOEHE. As a teacher educator, Participant 28 explained, "there is a difference between planning lessons and units, and actually designing them. The current curriculum doesn't require that pre-service teachers to acquire this skill. The curriculum and subject textbooks are preplanned by the ministry, and teachers are required to implement the curriculum, not design it." Other statements, which were deprioritized constituted enhancing creativity (39; -4) and fostering emotional connectedness and community (26; -4), as well as collaborating with colleagues (29; -3) and demonstrating entrepreneurial thinking (38; -4).

4.5. Viewpoint 5: Leading and Adapting Ethically

Teacher leadership skills (35; +5) and adapting to new situations (36; +4) were two competencies highly valued by the four participants associated with Viewpoint 5. They also believed pre-service teachers should have integrity (40; +5) and apply ethical principles (37; +4). As a multi-dimensional competency, having teacher leadership skills were rationalized based on its effect on acquiring other important skills. According to Participant 15, a

ministry specialist, “teacher leadership is the most important characteristic for the current workplace. Teachers who have leadership skills are able to create and innovate, they can make decisions and participate in community service in ways that serve teaching and learning”. These views were distinguished from the perceptions presented in Viewpoints 1 and 3, which viewed teacher leadership skills as requiring more time and experience. Moreover, in opposition to participants of Viewpoint 1, Participant 39, who was a teacher, considered adaptation skills particularly important and explained that “having the ability to adapt allowed teachers recently to continue teaching and prevent learning loss. In the future, these skills will also be important as circumstances change.” Participant 5, a PD specialist, described the variations among teachers who were teaching online during school closures and noted that “teachers should practice ethical principles and have integrity because they are responsible for enhancing educational outcomes. When they have self-monitoring skills, they will do their job without external observations or evaluations”. Additionally, among the positively rated statements, participants in Viewpoint 5 included using verbal and nonverbal communication skills (17; +4), having communication skills (31; +3), and having collaboration skills (32; +3). These competencies show a certain degree of interconnectedness, and participants chose to rate them all positively.

In examining the least valued competencies, participants of Viewpoint 5 had similar perceptions to Viewpoints 1, 2, and 4 in deprioritizing the competency of fostering emotional connectedness and community (26; −4). They also devalued the competency of participating in school decision-making (28; −4) and having knowledge of local policies (5; −5). The rationales provided ranged from considering these competencies as having “little impact on teaching and learning” (Participant 15; ministry specialist) to considering these statements as practice-oriented and requiring “experience and professional practice in the classroom” (Participant 5; PD specialist).

4.6. Viewpoint 6: Focusing on Students

K-12 students were the focus of the three participants associated with Viewpoint 6. As teachers, they believed that building on students’ knowledge (16; +5) and engaging them in cooperative work and self-directed learning (13; +5) were the most important competencies, which pre-service teachers should acquire to implement ESD. Relatedly, they also valued implementing a variety of instructional strategies (10; +4) and giving feedback to students (9; +4). As a prerequisite, participants also valued implementing a variety of assessments (7; +3). These highly prioritized statements revolved around the intricacies of daily teaching strategies that emphasize learners and their needs. Interestingly, having knowledge of learners (1; +3) was rated the highest by participants in Viewpoint 6, in comparison to other viewpoints. They also valued reflecting on teaching and learning approaches (30; +4) and collaborating with colleagues (29; +2).

In the post-sorting activity, Participant 34 justified her choice of using a variety of assessments, indicating that “assessments guide teaching, and teachers need to know students’ prior experiences and whether they have reached lesson objectives. They use this information to improve student learning and their own practices”. In justifying their choices, two participants agreed on the connectedness of “using different instructional strategies based on students’ prior knowledge” (P41), in order to “improve their motivation and engagement” (P36).

Contrasting these highly valued statements, participants of Viewpoint 6 shared similar beliefs with Viewpoints 1 and 5 on deprioritizing the need for knowledge of local education policies (5; −5) and participating in school decision-making (28; −5). Interestingly, they also devalued encouraging social interaction (20; −4) and having collaboration skills (32; −3). These competencies seem to conflict with the highly valued competencies of engaging students in cooperative work and collaborating with colleagues, yet holding conflicting beliefs may be attributed to the complexity of an individual’s belief systems.

5. Discussion and Practical Implications

This Q methodology study aimed to present the development and evaluation of a competency framework, which included competencies that pre-service teachers need in order to implement ESD in Qatar. The development of the competency statements followed recommendations in the literature to engage in a democratic discourse with teacher education stakeholders in their construction [5,6,8,15,22,23]. This initial step resulted in the development of 40 emergent competencies, constituting a framework for achieving ESD; that is to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” ([1], p. 18). Following this step, we examined the subjective viewpoints of teacher educators, PD specialists, ministry specialists, and teachers whom each sorted these statements according to their degree of relative importance. We identified six viewpoints, which described participants’ shared perceptions and presented these along with their justifications from the post-sorting activity. Specifically, the viewpoints highlighted (1) core classroom practices, (2) creativity and higher-order thinking, (3) digitally enriched instructional strategies, (4) local culture and ethics, (5) leading and adapting ethically, and (6) focusing on students. Although the viewpoints had some degree of agreement, overarching consensus statements were lacking and each viewpoint was characterized by distinct preferences. The viewpoints also emphasized competencies covering the three dimensions of what teachers should know, do and value in reference to implementing ESD. These results allude to the interrelationships among the competencies, and we begin to question the tradition of treating them as separate entities.

The comparison among these viewpoints shows the difficulties inherent in reaching a consensus on the competencies needed for pre-service teachers to implement ESD. The literature on the competencies needed for pre-service teachers to achieve ESD have been documented in previous research [27,28,42]. However, it was further acknowledged in the development of this competency framework that similar competencies are found in the literature on pre-service teacher development more generally [3–5,7–9,13,38,39]. This overlap and homogeneity among different frameworks for pre-service teacher competencies are seen as an opportunity for TPPs to adjust and redirect their intended outcomes toward ESD, which would require first and foremost conscientious efforts for consensus-building.

Therefore, beyond the scope of this study and as a potentially useful method to initiate such consensus, future research could consider conducting a Delphi study similar to Mohamed et al. [38] and Muñoz-Rodríguez et al. [39]. The range of stakeholder perceptions and subjectivity reveals the diversity and sometimes conflicting nature of teaching and teacher education practices. This lack of consensus raises concern and alludes to potential fragmentation in the way pre-service teachers are currently prepared for ESD [10,43]. We offer the competency framework and the resulting viewpoints as a springboard for teacher education stakeholders to engage in constructive dialogue around quality TPPs, including elements of a shared vision, coherence, and alignment among pre-service teachers’ learning experiences [44,45]. Such dialogue may lead to making better-informed decisions about how to reorient teacher preparation towards ESD [4,5,18,20,21], potentially leading to higher expectations and stronger teacher identities for pre-service teachers [43,46,47].

Despite the various perceptions among all viewpoints, there were several controversial statements (see Table 5), which were rated on opposite ends by different viewpoints. One particular controversial statement was the need for pre-service teachers to participate in decision-making and have teacher leadership skills. Recent studies have also questioned the ability of pre-service teachers to play an agentic role during their practicum experiences, with some indicating mixed results [47–49]. Nonetheless, the rationales provided by our participants on the need for practical experiences have also been supported by other studies, which have shown positive outcomes when pre-service teachers participate in teacher leadership development programs during their practicum experiences [48].

Table 5. Controversial statements with a minimum of two common viewpoints.

#	Statement	Viewpoints
3	Have knowledge of curriculum	1(+), 4(+)
4	Have knowledge of local culture	1(-), 2(-), 4(+)
5	Have knowledge of local education policies	3(-), 5(-), 6(-)
6	Design lessons and units of study	1(+), 2(+), 3(-), 4(-)
10	Implement a variety of instructional strategies	1(+), 3(+), 6(+)
13	Engage students in cooperative work and self-directed learning	3(+), 6(+)
16	Build on students' prior knowledge	5(-), 6(+)
26	Foster emotional connectedness and community	1(-), 2(-), 4(-), 5(-)
28	Participate in school decision-making	1(-), 2(+), 5(-), 6(-)
35	Have teacher leadership skills	1(-), 3(-), 5(+)
37	Apply ethical principles	4(+), 5(+)
38	Demonstrate entrepreneurial thinking	1(-), 3(-), 4(-)
39	Enhance creativity	2(+), 4(-)

(+) high value; (-) low value.

Another controversial statement pertained to the design competency (statements 6). While this competency is commonly associated with teachers' core practices [7–9], emerging viewpoints were based on perceptions of who was responsible for design and its definition. In the current context, the MOEHE oversees curriculum development and regulates teachers' implementation in a mandatory top-down manner. For some viewpoints (3 and 4), this role was considered as overriding teachers' responsibilities for design, while other viewpoints (1 and 2) emphasized them among the most valued teacher competencies. In practice, this result may translate into discrepancies in pre-service teachers' preparation for their role in designing lessons and units, which incorporate elements of ESD, leading to variations in their skills and abilities depending on whether they receive instruction on design or not. It may be necessary for education stakeholders to reach a consensus on how to integrate ESD principles into the curriculum, first and foremost, and then to identify the role of teachers in designing lessons and units, which translate curriculum documents into authentic practices for students.

Additionally, there were repeated instances in the viewpoints where stakeholders did not view fostering emotional connectedness and community (statement 26) as a significant competency for ESD. Yet, various literature [27,28] identify empathy as a core competency in achieving ESD. Similar results have been found in another study on pre-service teachers [42], as they do not emphasize the emotional dimension of teacher competencies. The responses by the education stakeholders in Qatar, along with those in the extant literature, illustrate the need for stakeholders who are responsible for curriculum design in TPPs to deeply engage with ESD and its definitions.

Other statements (e.g., 4, 16, and 39) were similarly controversial and may also lead to fragmentations or gaps in the TPP curriculum and its outcomes. To ensure that pre-service teachers learn the skills required for ESD, one undertaking includes participating in open discussions among the various education stakeholders on conflicting visions and notions, including reconsidering the need for the various standard frameworks currently adopted in the TPPs at the College of Education and the QNPSST developed for teachers working in government schools. This is not to reduce the number of opportunities for pre-service teachers to come to terms with different perceptions on teaching and learning, but rather to share common understandings and become conscientious about such diversity, while retaining autonomy for the different groups of stakeholders [43].

6. Conclusions

The study results highlighted an important characteristic of individuals' complex systems; that of their conflicting and interconnected nature [10,25]. Specifically, participants of Viewpoints 3 and 6 were found to harbor conflicting beliefs about what constitutes important teacher competencies for ESD, while other viewpoints revealed the intricacies of

the competencies and their interacting nature. This result provides a miniature illustration of the complexity inherent in the preparation of pre-service teachers who are exposed to such contesting beliefs and practices. Yet, the complexity of teacher education does not end there, but rather we must further envision the complexity of TPPs through the interactions and influences of multiple and varying stakeholders, communities, and contexts [14,15,17]. It is further important to suggest that ESD is in its nature similarly complex, and preparing pre-service teachers to achieve ESD would inherently be challenging. However, to move forward requires some form of consensus among education stakeholders that allows pre-service teachers to positively contribute to ESD. Acknowledging this complexity, and perhaps even embracing it as how things work in teacher education [16] can prove to be a thought-provoking and challenging undertaking, yet one which may allow education stakeholders to understand how teacher education outcomes vary and where to look for influences and interactions that may be contributing to such variations [10]. This study identified the need for a uniform approach towards equipping pre-service teachers with the competencies needed to achieve ESD and that education stakeholders should collaborate, discuss, and deeply examine which competencies are needed by pre-service teachers to achieve ESD. These discussions at the local level should further be tailored towards the policy landscape, in line with QNV and the attainment of a knowledge society, which is dependent on quality teachers and teaching.

The study is not without methodological limitations. First, the number of participants who developed the framework was relatively low. Additionally, it was not possible to encompass all potential viewpoints on a competency framework from a limited number of participants. Nonetheless, we adhered to recommendations in the complexity theory and teacher preparation literatures in the need to consult with multiple education stakeholders from the local context to achieve a broader, more nuanced understanding of their perceptions towards ESD. While the purpose of this study was to engage education stakeholders in the development of the competency framework, another main aim was to examine the degree of consensus and dissonance among them on the proposed framework. Using the Q methodology allowed us to gauge the diversity of perceptions and reach conclusions on the need for future initiatives to build consensus among stakeholders in regard to the competencies that pre-service teachers need to implement ESD. Future research may explore the use of the competency framework and the resulting viewpoints as a springboard for constructive discussions and dialogue around how things should work in teacher education toward achieving ESD.

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