KEY DETERMINANTS OF 21ST CENTURY TEACHER EFFECTIVENESS DOMAINS USING NOMINAL GROUP TECHNIQUE

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Abstract:

In the evolving landscape of 21st century education, the key determinants of teacher effectiveness have expanded to not only pedagogical skills but encompasses technological competencies, social-emotional intelligence and the integration of cultural elements in teaching. Using the Nominal Group Technique (NGT), a structured, systematic method, this study aims to determine and rank the key determinants of 21st century teacher effectiveness derived from the expert's consensus. A total of seven experts in this field from various educational backgrounds were involved in this study. Grounded by the experts' consensus and prominent authors' notion, the findings demonstrated four essential key determinants: pedagogical skills and instructional strategies, professional development and reflective teaching, social-emotional and interpersonal skills, and inclusivity and cultural responsiveness of teacher effectiveness in modern classroom teaching. As this study employed NGT to derive the key findings, it provides valuable insight and valid reference for future researchers, educational institution, school teachers, and policymakers to explore these suggested domains in teacher effectiveness and applied the proposed model to their teaching practices.

Keywords:

Teacher Effectiveness, NGT, Key Determinant, 21st Century Teaching

Introduction

Research on teacher effectiveness emerged a few decades ago and involved a multifaceted concept. Various studies by prominent educational researchers believed that teacher effectiveness is a critical determinant of student success, engagement in class, and overall academic performance. Teacher effectiveness is typically defined as the teacher's ability to foster student achievement, engagement and overall performance. As its definition revolved around these terms, most of the prominent authors in this field defined teacher effectiveness as teacher's ability to improve and evaluate students learning with well-designed instructional strategies that suit diverse student needs (Gao et al. 2008; Darling-Hammond, 2021; John Hattie, 2011; Muijs & Reynold, 2012), ability to foster student-teacher relationship (James Stronge, 2019) and involves collaboration with colleagues to contribute to a positive school environment (Gao et al. 2008). These definitions involve multifaceted concepts and critical components to define teacher effectiveness clearly.

As it involved a muti-facet concept, the determinants of teacher effectiveness encompassed a range of competencies that directly impact students' learning attributes. However, identifying the most significant and essential determinants or domains of teacher effectiveness remains challenging for researchers, educators, policymakers and stakeholders. The challenges are usually compounded by the environments, resources, geographical areas, teacher's competency, the diversity of student needs, cultures and the constant demands and changes in educational needs and reforms (Muijs & Reynolds, 2011). Addressing the challenges requires a proper framework. A plethora of research has consistently highlighted a few critical core factors to determine teacher effectiveness. Stronge (2018) and Muijs & Reynolds (2011) agree that classroom management is one of the most important determinants of teacher effectiveness. Teachers who can maintain a well-organised, productive learning environment, ensuring minimal disruptions and maximising learning time in class, are said to be effective. Hattie (2013), Darling-hammond (2011) and Cansoy et al. (2022) describe instructional planning and strategies as the most prominent factor, whereas Goe et al. (2008), Papay & Kraft (2016), Staiger & Rockoff (2010) agree with student engagement in class as the important domain in teacher effectiveness. On the other hand, Ronfeldt et al. (2018) and Campbell et al. (2012) acknowledged that teachers who are experts in content knowledge and pedagogy effectively convey concepts to students of varying ability levels are the most effective teacher. Other key determinants contributing to effective teaching, as outlined by experts, are formative assessment and feedback, collaboration with colleagues, teacher ability and flexibility, professional development, teacher-student relationship and student achievement.

Although various determinants of teacher effectiveness were identified many years ago, the consensus on the most critical determinants remains uncertain and primarily focuses on the traditional approach and definition. Does this interpretation apply to the current classroom context, especially in this VUCA environment? Furthermore, the existing determinants or domains do not integrate the elements of the 21st century classroom context and modern teaching environment. Therefore, the current study tries to identify integral determinants of teacher effectiveness in a 21st century classroom and rank the importance of each determinant using the Nominal Group Technique (NGT). This technique provides a powerful approach to address this need by synthesising insights from top-tier research and evaluating and brainstorming ideas from educational experts. NGT provides a collective, comprehensive, and data-driven understanding of what constitutes teacher effectiveness domains by engaging teachers, administrators, and academic officers in identifying and ranking the key determinants.

By employing NGT, this study aims to contribute and provide an evidence-based ranking of the most impactful determinants of teacher effectiveness in modern society classrooms. This approach not only enhances the current understanding of what constitutes teacher effectiveness but also serves as a guideline for future researchers in this field to identify important criteria, provide a clearer framework for supporting teachers in their professional growth, and enhance student outcomes.

Methodology

This study employed the Nominal Group Technique (NGT) to obtain and extract viewpoints from 7 participants of various educational backgrounds. The participants involved were four experienced primary and secondary school teachers, one Ministry of Education Officer, one District Officer and one Education stakeholder. Each participant has unique pedagogical and content knowledge expertise in this field. They were selected based on their experience in teaching and conducting various workshops and their expertise in pedagogical knowledge and content. With their posses qualification, comprehensive knowledge and experience in teaching, they contribute directly to practice-based knowledge, and they are justified and regarded as experts in this field. This is supported by Rowley (2002), who defined experts as acknowledged practitioners in their field and selected for their potential to provide an in-depth understanding of their area both academically and practically.

Prior to conducting NGT, the participants were grouped into three different time and date intervals in accordance with suggestions by Mustapha et al. (2023), Kennedy & Clinton (2009) and Williams et al. (2006). The first group consisted of 3 experienced teachers, the second group consisted of 2 MoE officers and another two participants from various educational backgrounds. Every participant involved in the NGT was enrolled via Google Meet meeting according to the respective time and date given. They were then instructed to rank the scores to the listed items, which the authors organised before the meeting. The meeting lasted 40 minutes for each session and took approximately two hours to complete the total participation.

The process of conducting the NGT technique involved a group discussion controlled by a leader or facilitator (Perry & Linsley, 2006). In this study, the author acts as a facilitator to collect ideas from the group members' interactions, discussions, and new information obtained during the NGT process. The authors listed the key determinants based on the findings, collected comprehensive readings of 20 articles from top-tier journals and prominent authors in this field, and brainstormed the participants' ideas. Although the authors listed the key determinants, all participants were encouraged to share, brainstorm their ideas and contribute to the findings before participating in the voting process. Subsequently, during the meeting, the participants were given time to discuss, vote, rank and select the key determinants that influence teacher effectiveness the most, as outlined by the authors. The process of implementing the NGT technique is explained in Table 1 below:

Table 1: NGT Implementation Process

Step	Description
A brief introduction and explanation	A brief introduction of the NGT process, outlining the steps involved and emphasising the purpose of generating and ranking determinants of teacher effectiveness, was explained to the participants. The participants were informed that their ideas, responses, and participation were equally important for this study.

Idea generation process	All participants independently generate their ideas on the most important factors contributing to teacher effectiveness. All participants were given 10 minutes to brainstorm their ideas individually during this step.
Round-robin sharing of ideas	At this stage, the participants share their ideas in a round-robin format, allowing them to clarify, expand on, or combine similar ideas. All participants were given an equal chance to deliver their comprehensive ideas, with the facilitator recording suggestions and ideas in the chat box section.
Group discussion for clarification	During this session, participants were allowed to discuss the listed ideas, clarify, expand on the points given, and combine similar ideas to reach a consensus. They also checked and balanced the previous key determinants of prominent researchers outlined by the facilitator.
Participants voting process	Participants independently vote and rank the ideas on the scale of key determinants of teacher effectiveness based on their perceived ideas and understandings.

Data Analysis

The NGT-PLUS Software was used to analyse the findings from 7 participants involved in the study. All the data obtained during the NGT session via Google Meet with the experts were key in to the NGT-PLUS Software. This voting process was carried out online in front of the invited experts.

Figure 1: NGT-PLUS Analysis Software

Figure 2: Example Of Data Entry From Expert Voting

Sampling Procedure

In NGT, each individual can give their opinion, suggestion and expert on the issues discussed (Siti Farhah & Saedah, 2015). To distinguish suitable experts, they must have the capacity and willingness to participate, sufficient time to participate, effective communication skills, and comprehensive knowledge and experience on the issues investigated (Abdullah & Islam). In this study context, the experts involved were individuals with a minimum of 5 years of teaching experience who do administrative tasks and are directly associated with educational systems.

The reliable sample size for NGT-based studies has been a topic of debate among researchers. There is no consensus on the definite number of experts. However, NGT typically works best with small to medium-sized groups, usually between 6 to 12 participants. Delbecq & Van de Ven (1971) who is the pioneer of this technique, recommend 5-7 experts, and it can also be broken into smaller groups to provide more in-depth communication (Lomax & McLeman, 1984) (Dobbie et al., 2004) (Mustapha et al., 2023). This study employed a sampling procedure following Delbecq & Van de Ven (1971) suggestion. A total of 7 experts from various educational backgrounds have participated in the study. According to Hubbard (2014), the total of a single well-informed expert insight can be equated and valuable as 100 laypeople. Therefore, a total of 7 experts are considered enough to draw findings and conclusions in this study. Table 2 provides an author reference for the NGT sampling process.

Table 2: Sampling Procedure

Author	Sample
Van De Ven and Delbecq (1971)	5-9 experts/participants
Horton (1980)	7-10 experts/participants
Harvey and Holmes (2012)	6-12 experts/participants
Abdullah and Islam (2011)	7-10 experts/participants
Carney et al. (1996)	Min. 6 experts/participants

Findings and Discussion

In this section, we will present the NGT results based on the consensus of 7 experts in this field. Table 4 presents the key constructs or determinants of 21st-century teacher effectiveness. Each voter rated these on a scale of 1 to 3, as shown in Table 3, with three indicating suitable and most important.

Table 3: Indicator Description

Indicator		
1- Not Suitable	2 - Neutral	3 – Suitable

Table 4: Key Construct/Determinant of Teacher Effectiveness

Construct/Determinant	Voter1	Voter2	Voter3	Voter4	Voter5	Voter6	Voter7	Total item score	Percentage	Voter Consensus
Pedagogical Skills and Instructional Strategies	3	3	3	3	3	3	3	21	100	Suitable
Professional Development and Reflective Teaching	3	3	3	3	3	3	3	20	100	Suitable
Social-emotional and Interpersonal Skills	3	2	3	3	2	3	3	19	90.48	Suitable
Inclusivity and Cultural Responsiveness	3	3	3	2	3	2	2	18	85.71	Suitable

The NGT analysis demonstrates that all four teacher effectiveness determinant percentage score constructs are more than 70 per cent, indicating all the listed constructs were within acceptable ranges. These investigations have established a threshold for the percentage at or over 70% (Deslandes, Mendes, Pires, & Campos 2010; Dobbie et al., 2004; Mustapha et al.2022). Pedagogical skills and instructional strategies, professional development, and reflective teaching received 100 per cent of experts' agreement, hence becoming the most prominent and important construct for measuring teacher effectiveness determinants. The social-emotional and interpersonal skills, inclusivity, and cultural responsiveness received experts' agreement of 90.48 per cent and 85.71 per cent, respectively. We can conclude that all participants in this study agree that all four constructs outline possess an essential determinant and critical area for measuring teacher effectiveness suitable for 21st-century classrooms and pedagogy.

Table 5: Pedagogical Skills and Instructional Strategies

Items / Elements	Voter1	Voter2	Voter3	Voter4	Voter5	Voter6	Voter7	Total item score	Percentage	Rank Priority	Voter Consensus
Digital Literacy and Technology Integration	3	2	3	3	3	3	3	20	95.24	2	Suitable
Critical Thinking and Problem Solving	3	3	3	3	2	3	2	19	90.48	3	Suitable
Adaptability and Flexibility	3	3	3	3	3	3	3	21	100	1	Suitable
Student Engagement and Motivation	3	3	3	3	3	3	3	21	100	1	Suitable
Formative Assessment and Feedback	3	2	3	3	3	3	3	20	95.24	2	Suitable

Table 5 shows the total percentage value scores for each item or element in the pedagogical skills and instructional strategies constructs. Digital literacy and technology integration score 95.24 per cent of voters agree that teachers who integrate digital tools to create interactive learning environments in class, such as digital apps, virtual labs or interactive whiteboards, can engage lesson delivery and student engagement. Critical thinking and problem-solving score 90.48 per cent of voters agree that teachers who promote higher-order thinking skills and problem-solving abilities provide a platform for students to research, analyse and propose solutions to problems as effective teachers in the modern classroom. All participants agree that teacher adaptability and flexibility in teaching methods based on students' comprehension level, engagement, and motivation is crucial to delivering and staying engaged in effective teaching. Additionally, teachers who regularly assess students and give constructive feedback score 95.24 per cent agreement from the participants. This study concludes that all the pedagogical skill and instructional strategy elements are equally important to determine teacher effectiveness in modern classrooms.

Table 6: Professional Development and Reflective Teaching

Items / Elements	Voter1	Voter2	Voter3	Voter4	Voter5	Voter6	Voter7	Total item score	Percentage	Rank Priority	Voter Consensus
Collaboration and Professional Learning	3	3	3	3	2	3	3	20	95.24	2	Suitable
Growth Mindset and Lifelong Learning	3	3	3	3	2	3	2	19	90.48	3	Suitable
Ethical and Reflective Practice	3	2	3	3	2	3	3	19	90.48	3	Suitable
Leadership and Initiative	3	3	3	3	3	3	3	21	100	1	Suitable

Table 6 indicates four items measuring professional development and reflective teaching constructs. Collaboration and professional learning score of 95.24 per cent is among the integral indicators. Teachers who actively engage in professional Learning Communities (PLCs) and participate in teacher workshops, online courses or peer coaching sessions to upskill and stay updated with educational trends and changes are highly effective. Furthermore, an element of a growth mindset and a lifelong learning score of 90.48 are equally crucial to ethical and reflective teaching. Teachers are considered effective when they commit to continuous learning and improvement, seeking new teaching strategies to improve pedagogical skills and setting professional goals. Leader and initiative element received 100 per cent participants' agreement as those teachers who take proactive steps to enhance classroom and school functionality, demonstrate good leadership skills and stay innovative by organising school programs, professional development, actively involved inert-school collaborations, Non-Governmental organisations (NGOs) or Corporate Social Responsibility (SCR) are the important descriptors for the 21st century teacher effectiveness determinants. We can conclude that all participants in this study agree on all four elements of professional development and reflective training for measuring teacher effectiveness suitable for 21st-century classrooms and pedagogy.

Table 7: Social-Emotional and Interpersonal Skills

Items / Elements	Voter1	Voter2	Voter3	Voter4	Voter5	Voter6	Voter7	Total item score	Percentage	Rank Priority	Voter Consensus
Socio-emotional Learning (SEL) Support	3	3	3	3	3	3	3	21	100	1	Suitable
Interpersonal and Communication Skills	3	2	3	3	3	3	3	20	95.24	2	Suitable
Work-Life Balance and Well-being	2	3	3	3	3	2	3	19	90.48	3	Suitable

Table 7 presents elements of social-emotional and interpersonal skills rated by the seven experts. Of all the aspects, the teacher who can support their students' socio-emotional learning (SEL) scores 100 per cent, the interpersonal and communication skills score 95.24 per cent, and the work-life balance and well-being score 90.48 per cent of experts' agreement, respectively. All the elements in this construct are important to identify the teacher's effectiveness. Teachers who create a safe environment for students' emotional well-being, promote empathy, maintain a healthy relationship with their students, and balance work and personal life for themselves are said to be highly effective teachers. Therefore, we can conclude that this study agrees that all social-emotional and interpersonal skills elements are appropriate and relevant.

Table 8: Inclusivity and Cultural Responsiveness

Items / Elements	Voter1	Voter2	Voter3	Voter4	Voter5	Voter6	Voter7	Total item	Percentage	Rank Priority	Voter Consensus
Cultural Responsiveness and Inclusivity	3	3	3	3	3	3	3	21	100	1	Suitable
Global Awareness and Sustainability	2	3	3	3	3	3	3	20	95.24	2	Suitable

Table 8 shows the analysis of two key items related to inclusivity and cultural responsiveness, which presents a cultural responsiveness and inclusivity score of 100 per cent expert agreement and a global awareness and sustainability score of 95.24 per cent. This construct aligns with UNESCO's education goal, which promotes inclusivity and sustainability. In cultural responsiveness and inclusivity, effective teachers must be able to use examples from various cultures in lessons to encourage equality and respect in the classroom. In global awareness and sustainability, effective teachers can prepare their students for global citizenship by integrating sustainability themes and global interrelation into lessons. It can be concluded that all the two elements are necessary to measure teacher effectiveness in the global context.

The NGT process also required all participants to rank each teacher's effectiveness constructs accordingly. The bar chart, as seen in Figure 3, represents the distribution of the most important domains in teacher effectiveness research. Professional development and reflective practice received the highest number of expert voters, indicating as the most important determinant. Pedagogical skills and instructional strategies have a notable count, showing that this domain is also a significant contributor to teacher effectiveness determinants. Social-emotional and interpersonal skills are moderately important to teacher effectiveness domains, followed by inclusivity and cultural responsiveness.
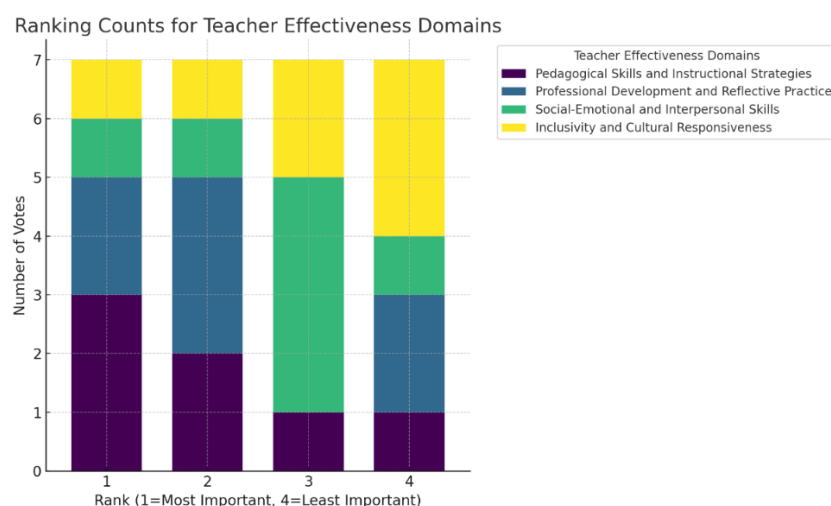

Figure 3: Teacher Effectiveness Domains

The pyramid diagram in Figure 4 presents four key determinants of teacher effectiveness in 21st century education, arranged hierarchically from most important to least important according to the experts' perception of the modern classroom. Each pyramid level reflects its priority from 1 to 4 based on its significance and importance to this research area. Professional development and reflective teaching become essential skills where digital literacy and technology integration, critical thinking and problem-solving, teacher adaptability and flexibility, and student engagement and feedback are the domains constructed as key determinants. Professional development and reflective consist of teacher collaboration and professional learning, growth mindset and lifelong learning, and ethical and reflective practice contribute to the second most important key determinants in teacher effectiveness. The third determinant is social-emotional and interpersonal skills, which consist of social-emotional learning (SEL) support, interpersonal and communication skills, and work-life balance and well-being, which are important elements to measure and justify effective teachers. The expert consensus was also drawn that inclusivity and cultural responsiveness are essential for maintaining effective teachers and classrooms. Therefore, the authors visualise all the key determinants of 21st century teacher effectiveness in a hierarchical pyramid diagram model, as shown in Figure 4 below.

Figure 4: Key Determinants of 21st Century Teacher Effectiveness Model

Conclusion

The Nominal Group Technique (NGT) study has identified and prioritised the key determinants of teacher effectiveness that are most relevant in the context of 21st century education. Through a structured NGT process, the participant's expert consensus was drawn, and it was concluded that four domains were essential determinants for effective teaching. The key domains are pedagogical skills and instructional strategies, professional development and reflective practice, social-emotional and interpersonal skills, and inclusive and cultural responsiveness. Fourteen indicators in four listed constructs can be used as an alternative and effort to measure core competencies that define effective teaching in the uncertainty and rapid advancement of technology classrooms. These determinants reflect the evolving need for modern classrooms and align with UNESCO's goal for Education. Although this technique is simple, it saves time and helps the researcher to obtain accurate and precise views. Ultimately, the consensus drawn can guide new researchers, educational institutions, teacher training programs and policymakers to prepare and develop the necessary skills in the modern classroom.

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