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School Leadership Scale for Teachers' Pedagogical Competence (SLS-TPC): Designing and Validity Evaluation

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Abstract

Background: *School leadership (SL) is essential to the overall growth of the school setup, especially in the improvement of the teachers' pedagogical competence (TPC). The quality of TPC was not up to the mark hence it was expected that SL may help teachers to improve their TPC.*

Purpose: *The purpose of this study was to design and evaluate the content validity (CV) of a school leadership scale (SLS) to improve teachers' pedagogical competence (TPC) using the content validity ratio (CVR), content validity index (CVI), and modified kappa (k*).*

Methods*: The SLS-TPC used the three-stage procedure outlined by Almanasreh, Moles, and Chen (2018)**. Thirty-six (36) items were developed after reviewing the literature. The researcher consulted ten experts to establish content validity using the approaches of Lawshe (1975), Yusoff (2019), and Polit et al. (2007). CVR was computed using a three-point scale, whereas CVI was determined using a four-point scale. Items with low CVR (<0.62) and low I-CVI (<0.78) were not considered.*

Results: *The instrument consisted of 4 constructs: (1) the role of secondary school head as a transformational leader (TL), (2) the role of secondary school head as an instructional leader (IL), (3) the role of secondary school head as a distributed leader (DL), and (4) the role of secondary school head as an authentic leader (AL). After evaluation, thirty-two (32) items remained on the scale. The values for CVR ranged from .80 to 1 and for I-CVI values varied from .90 to 1. The value of S-CVI/Ave was .96, whereas k* varied from .90 to 1. All of these values confirmed the excellent content validity.*

Conclusion: *The newly developed school leadership scale for TPC (SLS-TPC) had acceptable CVR, CVI, and k*.*

Keywords: *School Leadership Scale, Teachers' Pedagogical Competence, Content Validity*

Introduction

School leadership (SL) is a critical component in improving educational standards and student outcomes. School leaders as principals and head teachers are responsible for creating a healthy school atmosphere, supporting teachers' professional development, and fostering effective teaching and learning practices. Moreover, SL entails not only managing the school organization, but it also involves influencing teachers' pedagogical competence (TPC) to improve the quality of the teachers. The educational system and SL in Pakistan face many challenges including deficiency in the TPC which indicates compromised quality of teachers in public schools. Quality teachers are the foundation of the education system. (Parveen & Tran,

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Vol. 3, No. 2 (2023)
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2020; Saeed et al., 2013). According to UNESCO (2018) strengthening SL to improve teaching and learning is one of the solutions offered to accomplish the Education 2030 agenda (goal 4. c). Studies have shown that SL has the second highest effect on student learning outcomes after classroom teaching (Leithwood & Seashore-Louis, 2012; Leithwood et al., 2004; Varela & Fedynich, 2020). Effective leaders choose the areas of their school that should be prioritized to assist kids in learning. This is accomplished through a set of leadership behaviors that influence student's learning (VVOB, 2018). SL enhances the quality of teachers and their competencies (Cansoy & Parlar, 2018; Kumari, Hameed, Mazumder, & Sathyan, 2020).

Teachers' competence (TC) is a complex concept that has been understood in a variety of ways in the education sector. TC is typically related to the professional skills and knowledge that teachers possess or should possess (Antera, 2021). The main branches of TC include social competence, personal competence, professional competence, and pedagogical competence (Thakur & Shekhawat, 2014). Teachers' pedagogical competence (TPC) is the capacity of teachers to develop, administer, and assess learning activities that are appropriate for their students' needs (Chi, Tu, & Minh, 2020; Ho et al., 2023; Kim, Lee, & Cho, 2022; Wang, Derakhshan, & Rahimpour, 2022). TPC includes the use of multiple teaching methods, tactics, and resources to engage students in active learning and enhance their cognitive, social, and emotional growth.

Multiple SL scales can be used to measure several aspects of leadership behavior and practices in educational settings, however, there exists no scale that measures SL with a focus on improving TPC. SL needs a scale to measure its role as a transformational leader, distributed leader, instructional leader, and authentic leader to improve TPC. Moreover, to ensure the scale's effectiveness in improving TPC, its content validity (CV) must be tested by examining the amount to which its items accurately reflect the desired aspects. Validity in questionnaire development refers to how well the instrument measures what it promises to measure. Content validity assesses whether a tool contains all the significant and relevant content of the construct being measured.

To increase TPC, the focus of this study was to develop and evaluate the content validity (CV) of SLS-TPC. For this purpose, the researcher utilized the content validity ratio (CVR), the content validity index (CVI), and the modified kappa (k*). SLS-TPC initially contained 36 items belonging to 4 constructs to measure the role of SL in improving TPC. After content validity evaluation, 32 items remained in the instrument.

Method

The SLS-TPC used the three-stage procedure outlined by Almanasreh, Moles, and Chen (2018) in which the first stage focuses on instrument design. The second stage involves acquiring judgmental evidence (content validity) from an expert panel, and the third stage relates to the revision and reconstruction.

Stage one: Instrument Development (ID)

Vol. 3, No. 2 (2023)
EDUCATIONAL RESEARCH AND INNOVATION (ERI)
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The instrument design (ID) phase is the process of developing a questionnaire that can accurately and consistently assess the construct of interest. ID includes three sub-phases (i) domain determination, (ii) item formulation, and (iii) instrument construction. In the first sub-phase, first of all, the theoretical and practical definitions of the concept to be assessed must also be considered. Conceptual definition tells the meaning of the concept, and operational or practical definition describes how to measure the construct. The conceptual and operational definitions were defined. The definitions of school leadership (SL) and teachers' pedagogical competence (TPC) were defined through a literature review. According to the literature, SL is the role of directing and managing schools to promote successful teaching and learning (Chatzipanagiotou & Katsarou, 2023; Hartinah et al., 2020; Lumban Gaol, 2023; Pont et al., 2008), whereas TPC is described as teachers' capability to supervise learning, which involves planning for learning, implementing, and evaluating the learning outcomes of students (Rahman, 2014). Four domains of the instrument were identified in the initial version through literature review, qualitative interviews, and focus group, which were; (i) the role of secondary school head (SSH) as a transformational leader (TL) in improving TPC, (ii) the role of SSH as an instructional leader (IL) to improve TPC, (iii) the role of SSH as a distributed leader (DL) to improve TPC, and (iv) the role of SSH as an authentic leader (AL) to improve TPC (Ahmad & Batool, 2018; Asim et al., 2023; Bahzar, 2019; Bush et al., 2018; Bush & Glover, 2014; Danbaba & Panshak, 2021; Gougas & Malinova, 2021; Gumus et al., 2018; Leithwood, 2005; Sharif, et al., 2020). The role of SSH or SL as TL encourages and inspires teachers to innovate and develop new ways to improve their pedagogical competence (Andriani et al., 2018; Belan & Niron, 2021; Eliophotou-Menon & Ioannou, 2016; Onorato, 2013; Susilawati et al., 2022). In the instructional leader role, SSH/SL focuses on teaching and learning and improves students learning and teachers' effectiveness (Bada et al., 2020; Bellibaş et al., 2021; Fink & Markholt, 2011; Ismail et al., 2018; Nguyen et al., 2022; Shava et al., 2021; Sibomana, 2022; Wahab et al., 2020). As a DL, a SSH/ SL distributes leadership duties among teachers and focuses on collaboration, trust, and learning in schools (Bellibaş et al., 2021; Berjaoui & Karami-Akkary, 2020; Joo, 2020; Liu & Watson, 2020; Nawab & Asad, 2020; O'Shea, 2021). In the role of AL, an SSH/SL creates a positive ethical climate in schools, creates conditions for developing teachers, and openly shares information (Aria et al., 2019; Asghar et al., 2023; Hayata & Rochanah, 2021; Saeed & Ali, 2019; Wong & Laschinger, 2013).

After domain specification, generating items that represent each domain is essential in instrument development. Items for each domain were generated in the background of a literature review and qualitative interviews. In the instrument construction process stage, the initial version of the instrument was provided to a three-person advisory group of experts for evaluating the instrument's framework, domains, and items. The instrument was reviewed and each domain as well as the item was checked for structure and clarity.

Stage two: Establishing Judgment Evidence (Content Validity)

To verify an instrument, extensive validation is needed. The validity of the tool is the amount to which any tool measures what it was supposed to measure, and content validity

Vol. 3, No. 2 (2023)
EDUCATIONAL RESEARCH AND INNOVATION (ERI)
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assesses how effectively objects match or reflect a certain domain and is tested quantitatively. Finding evidence of content validity involves determining how well relevant material was collected and how effectively the information is reflected in instrument items. For judgment evidence, expert opinion was required. Currently, there is no consensus on the number of content experts needed to analyze an instrument, and the maximum number of experts has yet to be determined. However, a frequent approach is to use the opinions of up to ten experts. Almanasreh et al. (2018) suggested between five to ten experts for content validity.

Before performing the study, the researcher got permission from experts through invitation letters and telephone calls to take part in the research process for validation of the instrument. The experts had sound subject knowledge and theoretical background to conduct an in-depth assessment of the instrument. After their positive response, the researcher proceeded with stage two which was the establishment of content validity for which a cover letter and two content validity assessment forms were utilized. One of the forms contained a three-point scale (1 = *denotes essential*, 2 = *helpful but not required,* and 3 = *not required*) for CVR evaluation and the second form contained a four-point scale (1 = *not suitable*, 2 = *slightly suitable*, 3 = *moderately suitable*, and 4 = *highly suitable*) for CVI evaluation. Additionally, two copies of the developed instrument were sent to ten experts for evaluation. After receiving their responses, CVR and CVI were calculated.

Assessment of Content Validity Ratio (CVR)

Among the most often used methods for calculating CVR is Lawshe's item statistic (Almanasreh et al., 2018). CVR is a statistical metric used in tool development to assess the usefulness of an item. CVR value is calculated by the formula; CVR= (Ne- N/2)/ (N/2); where 'Ne' represents the number of experts who rated an item as 'essential' and 'N' is the overall number of experts (Madadizadeh & Bahariniya, 2023; Shrotryia & Dhanda, 2019; Zamanzadeh et al., 2015). The results of this procedure range from +1 to -1; positive numbers indicate that at least half of the experts thought the item was important. The closer the CVR is to 1.0, the more essential the item is thought to be. Lawshe's table of CVR shows the minimal CVR required to keep the item on the scale (Lawshe, 1975). For ten experts CVR minimal value should be 0.62. After determining the CVR values of all items, the CVI of the entire instrument was identified. The average of all CVR values is denoted as CVI.

Assessment of Content Validity Index (CVI)

The CVI is a statistical metric utilized in the design and evaluation of measuring instruments. It assesses how effectively each instrument item represents the construct that the instrument is supposed to evaluate. CVI for each item of instrument is denoted as "I-CVI" and for overall instrument it is denoted as "S-CVI". CVI is derived from expert assessments of the effectiveness or suitability of each item's content. The method used to compute CVI is: *CVI= The number of experts who agree on items graded 3 or 4 / The overall number of experts*.

A CVI of at least .80 for ten experts is regarded as a reasonable criterion for recognizing an item as legitimate. (Davis, 1992). To determine the I-CVI, the number of experts who rated

Vol. 3, No. 2 (2023)
EDUCATIONAL RESEARCH AND INNOVATION (ERI)
e-ISSN:2710-4354
p-ISSN:2076-9660

every item as highly suitable is divided by the overall number of experts (Yusoff, 2019). I-CVI greater than .79 indicates that the item is suitable; between .70 to .79, it requires changes; and less than .70, it indicates that the item should be eliminated (Gizaw, Yalew, Bitew, Lee, & Bisesi, 2022). S-CVI was calculated as a mean of I-CVI values. To find out S-CVI-Ave, all the I-CVIs are added together and then divided by the total number of items. To calculate S-CVI-UA, all the items are added having I-CVI=1 and then divided by the total number of items. The values of S-CVI-UA 0.8, and S-CVI-Ave 0.9 indicate high content validity of an instrument (Rodrigues, Adachi, Beattie, & MacDermid, 2017; Stasi et al., 2020). Before the computation, the appropriate rating was entered as '1' for a suitable scale of 3 or 4, and '0' (zero) for a suitable scale of 1 or 2.

Assessment of Modified Kappa (k*)

Cohen (1960) proposed the Kappa coefficient (k) as a means of assessing inter-rater reliability. The kappa coefficient reflects the percentage of reliability that remains after removing the possibility of reliability. Polit, Beck, and Owen (2007) introduced a fresh content validity approach known as modified kappa (k*) that takes into account chance agreement in each I-CVI. For determining K*, first of all, the probability of chance agreement is found out as pc= [N! /A! (N-A)!] *.5^N in which 'N' represents the total number of experts, whereas 'A' is the number of experts who agree on highly suitable. The k* is determined by k*=1-CVI-pc / 1-pc. According to Landis and Koch (1977), the value of kappa above .60 is considered significant, however, Polit et al. (2007) recommend three acceptable ranges for each k*; exceptional (greater than .74), good (.60 to .74), and fair (.40 to .59).

Stage Three: Revision and Reconstruction

After the evaluation and the experts' opinions from the judgment evidence stage, the researcher decided whether to continue or make changes to the instrument. All the items had excellent content validity, so there was no need to conduct this stage.

Results

Table 1

Content Validity Ratio (CVR) Result

St.#	E. 1	E. 2	E. 3	E. 4	E. 5	E. 6	E. 7	E. 8	E. 9	E. 10	Total Experts	Total Essential	CVR
TL1	X	X	X	X	X	X	X	X	X	X	10	10	1
TL2	X	X	X	X	X	X	X	X	X	X	10	10	1
TL3	X	X	X	X	X	X	X	X	X	X	10	10	1
TL4	-	X	X	X	X	X	X	X	X	X	10	9	.80
TL5	X	X	X	X	X	X	X	X	X	X	10	10	1

Vol. 3, No. 2 (2023)
EDUCATIONAL RESEARCH AND INNOVATION (ERI)
e-ISSN:2710-4354
p-ISSN:2076-9660

TL6	X	X	X	X	X	X	X	-	X	X	10	9	.80
TL7	X	X	X	X	X	X	X	X	X	X	10	10	1
TL8	X	X	X	X	X	X	X	X	-	X	10	9	.80
TL9	X	X	X	X	X	X	X	X	X	-	10	9	.80
IL1	X	X	X	X	X	X	X	X	X	X	10	10	1
IL2	X	X	X	X	X	X	X	X	X	X	10	10	1
IL3	X	-	X	X	X	X	X	X	X	X	10	9	.80
IL4	X	X	X	X	X	X	X	X	X	X	10	10	1
IL5	X	X	X	X	X	X	X	X	X	X	10	10	1
IL.6	X	X	X	X	X	X	X	X	-	X	10	9	.80
IL.7	X	X	X	X	X	X	X	X	X	X	10	10	1
IL8	X	X	X	X	X	-	X	X	X	X	10	9	.80
DL1	X	X	X	X	X	X	X	X	X	X	10	10	1
DL2	X	X	X	X	X	X	X	X	X	X	10	10	1
DL3	X	X	X	X	X	X	X	X	X	X	10	10	1
DL4	X	X	X	X	X	X	X	X	X	X	10	10	1
DL5	X	X	X	X	X	X	X	X	X	X	10	10	1
DL6	X	X	X	X	X	X	X	-	X	X	10	9	.80
DL7	X	X	X	X	X	X	-	X	X	X	10	9	.80
DL8	X	X	X	X	X	X	X	X	X	-	10	9	.80
AL1	X	X	X	X	X	X	X	X	-	X	10	9	.80
AL2	X	X	X	X	X	X	X	X	X	X	10	10	1
AL3	X	X	X	X	X	X	X	X	X	X	10	10	1
AL4	X	X	X	X	X	X	X	X	X	X	10	10	1
AL5	X	X	X	X	X	X	X	X	X	X	10	10	1

Vol. 3, No. 2 (2023)
EDUCATIONAL RESEARCH AND INNOVATION (ERI)
e-ISSN:2710-4354
p-ISSN:2076-9660

AL6	X	X	X	X	X	X	X	-	X	X	10	9	.80
AL7	X	X	X	X	X	X	-	X	X	X	10	9	.80
(Average CVR)												CVI	.92

Note. TL = transformational leader, IL = instructional leader, DL = distributed leader, AL = authentic leader, E = expert.

In the CVR evaluation, for each item, CVR was produced. The critical value for each item was not less than .62 for ten experts (Lawshe, 1975). Four items IL9, DL9, and AL8, AL9 were removed from the instrument due to a low CVR value of .20 < .62. Thirty-two items were marked as essential. Thirteen items contained a critical value of .80 and nineteen items had a critical value of 1 which depicts that all items are appropriate for the instrument. The average CVR value (CVI) was .92.

Table 2

Content Validity Index (CVI) Results

Item	E. 1	E. 2	E. 3	E. 4	E. 5	E. 6	E. 7	E. 8	E. 9	E. 10	Experts Agreed	I-CVI	UA
TL1	1	1	1	1	1	1	1	1	1	1	10	1	1
TL2	1	1	1	1	1	1	1	1	1	1	10	1	1
TL3	1	1	1	1	1	1	1	1	1	1	10	1	1
TL4	0	1	1	1	1	1	1	1	1	1	9	.90	0
TL5	1	1	1	1	1	1	1	1	1	1	10	1	1
TL6	1	1	1	1	1	1	1	0	1	1	9	.90	0
TL7	1	1	1	1	1	1	1	1	1	1	10	1	1
TL8	1	1	1	1	1	1	1	1	0	1	9	.90	0
TL9	1	1	1	1	1	1	1	1	1	0	9	.90	0
IL1	1	1	1	1	1	1	1	1	1	1	10	1	1
IL2	1	1	1	1	1	1	1	1	1	1	10	1	1
IL3	1	0	1	1	1	1	1	1	1	1	9	.90	0
IL4	1	1	1	1	1	1	1	1	1	1	10	1	1

Vol. 3, No. 2 (2023)
EDUCATIONAL RESEARCH AND INNOVATION (ERI)
e-ISSN:2710-4354
p-ISSN:2076-9660

IL5	1	1	1	1	1	1	1	1	1	1	10	1	1
IL6	1	1	1	1	1	1	1	1	0	1	9	.90	0
IL7	1	1	1	1	1	1	1	1	1	1	10	1	1
IL8	1	1	1	1	1	0	1	1	1	1	9	.90	0
DL1	1	1	1	1	1	1	1	1	1	1	10	1	1
DL2	1	1	1	1	1	1	1	1	1	1	10	1	1
DL3	1	1	1	1	1	1	1	1	1	1	10	1	1
DL4	1	1	1	1	1	1	1	1	1	1	10	1	1
DL5	1	1	1	1	1	1	1	1	1	1	10	1	1
DL6	1	1	1	1	1	1	1	0	1	1	9	.90	0
DL7	1	1	1	1	1	1	0	1	1	1	9	.90	0
DL8	1	1	1	1	1	1	1	1	1	0	9	.90	0
AL1	1	1	1	1	1	1	1	1	0	1	9	.90	0
AL2	1	1	1	1	1	1	1	1	1	1	10	1	1
AL3	1	1	1	1	1	1	1	1	1	1	10	1	1
AL4	1	1	1	1	1	1	1	1	1	1	10	1	1
AL5	1	1	1	1	1	1	1	1	1	1	10	1	1
AL6	1	1	1	1	1	1	1	0	1	1	9	.90	0
AL7	1	1	1	1	1	1	0	1	1	1	9	.90	0
											S-CVI/Ave	.96	
											S-CVI/UA		.59
Relevance proportion	.97	.97	1	.97	1	.97	.94	.91	.91	.94	Ave-relevance proportion	.96	

Note. TL = transformational leader, IL = instructional leader, DL = distributed leader, AL = authentic leader, E = expert.

In CVI evaluation, I-CVI for all items was not less than .80 which should be .80 and above (Davis, 1992). I-CVI values of .78 and above show excellent content validity (Handage &

Vol. 3, No. 2 (2023)
EDUCATIONAL RESEARCH AND INNOVATION (ERI)
e-ISSN:2710-4354
p-ISSN:2076-9660

Chander, 2021; Kovacic, 2018; Lynn, 1986; Polit et al., 2007). Only four items IL9, DL9, AL8, and AL9 had I-CVI value .60 < .78 which were eliminated. Thirteen items had I-CVI = .90 and nineteen items showed I-CVI = 1. Overall S-CVI/Ave was .96 and the average relevance proportion was .96. S-CVI = .90 and above specifies excellent content validity (Kovacic, 2018; Stasi et al., 2020).

Table 3

The Modified Kappa (K) Results*

Item #	Total Experts	Experts give a rating of 3 or 4	I-CVI	pc	k*	Assessment
TL1	10	10	1	0.00098	1	Excellent
TL2	10	10	1	0.00098	1	Excellent
TL3	10	10	1	0.00098	1	Excellent
TL4	10	9	.90	0.0098	.90	Excellent
TL5	10	10	1	0.00098	1	Excellent
TL6	10	9	.90	0.0098	.90	Excellent
TL7	10	10	1	0.00098	1	Excellent
TL8	10	9	.90	0.0098	.90	Excellent
TL9	10	9	.90	0.0098	.90	Excellent
IL1	10	10	1	0.00098	1	Excellent
IL2	10	10	1	0.00098	1	Excellent
IL3	10	9	.90	0.0098	.90	Excellent
IL4	10	10	1	0.00098	1	Excellent
IL5	10	10	1	0.00098	1	Excellent
IL6	10	9	.90	0.0098	.90	Excellent
IL7	10	10	1	0.00098	1	Excellent
IL8	10	9	.90	0.0098	.90	Excellent
DL1	10	10	1	0.00098	1	Excellent

Vol. 3, No. 2 (2023)
EDUCATIONAL RESEARCH AND INNOVATION (ERI)
e-ISSN:2710-4354
p-ISSN:2076-9660

DL2	10	10	1	0.00098	1	Excellent
DL3	10	10	1	0.00098	1	Excellent
DL4	10	10	1	0.00098	1	Excellent
DL5	10	10	1	0.00098	1	Excellent
DL6	10	9	.90	0.0098	.90	Excellent
DL7	10	9	.90	0.0098	.90	Excellent
DL8	10	9	.90	0.0098	.90	Excellent
AL1	10	9	.90	0.0098	.90	Excellent
AL2	10	10	1	0.00098	1	Excellent
AL3	10	10	1	0.00098	1	Excellent
AL4	10	10	1	0.00098	1	Excellent
AL5	10	10	1	0.00098	1	Excellent
AL6	10	9	.90	0.0098	.90	Excellent
AL7	10	9	.90	0.0098	.90	Excellent

Note. TL = transformational leader, IL = instructional leader, DL = distributed leader, AL = authentic leader, E = expert.

In the modified Kappa evaluation, the **k*** value for each item was not less than .74. K* above .74 indicates excellent content validity (Almanasreh et al., 2018; Habibi, Yusop, & Razak, 2020; Moudi et al., 2022; Polit et al., 2007; Suhaini, Ahmad, & Bohari, 2021). Thirteen items showed k* = .90, and nineteen items indicated k*=1 which shows excellent content validity.

Discussion

The study was conducted to find out the content validity of the school leadership scale for teachers' pedagogical competence (SLS-TPC) and it demonstrated great content validity. This research describes the construction and testing of measurement features of an SLS-TPC for improving the teachers' pedagogical competence (TPC). This questionnaire has four domains (i) the role of SSH as a TL in improving TPC, (ii) the role of SSH as an IL to improve TPC, (iii) the role of SSH as a DL to improve TPC, and (iv) the role of SSH as an AL to improve TPC. This scale contains thirty-two items in overall four domains. SL comprises not only managing the school administration but also influencing TPC to enhance teacher quality. The education system and SL in Pakistan confront several obstacles, including an insufficient level of TPC, resulting in poor teacher quality, especially in public schools. Hence, there was a need to develop a tool for

Vol. 3, No. 2 (2023)
EDUCATIONAL RESEARCH AND INNOVATION (ERI)
e-ISSN:2710-4354
p-ISSN:2076-9660

measuring school leadership (principal, headmaster, headteacher) that helps them to improve TPC in Punjab, Pakistan.

To examine the content validity of the SLS-TPC, two scales, a 3-point scale for CVR and a 4-point scale for determining CVI were used. The researcher consulted ten experts to evaluate the instrument as Almanasreh et al. (2018) suggested that between five to ten experts for content validity are appropriate. One method of calculating content validity is the CVR technique, which calculates how many experts consider an item essential. In the CVR evaluation, thirteen items contained a critical value of .80, and nineteen items had a critical value of 1 which depicts that thirty-two items out of thirty-six are appropriate for the instrument. According to Lawshe (1975), the CVR value for each item should not be less than .62. All items had CVR ranging from .80 to 1 which is appropriate.

For measuring content validity, another technique is CVI which is the most frequent way. The I-CVI measures the content validity for each item and S-CVI measures the content validity of the entire instrument. An I-CVI value of .78 and above is considered excellent, and the S-CVI/Ave value of 0/90 and above is considered excellent (Lynn, 1986). Thirteen items had I-CVI= .90, nineteen items showed I-CVI=1 and overall S-CVI/Ave was .96 which shows excellent content validity. Polit et al. (2007) proposed a novel technique of modified kappa (k*) for content validity evaluation that accounts for chance agreement in each I-CVI. They suggested that k* for each item above .74 indicates excellent value. Thirteen items showed k*= .90 and nineteen items indicated k*=1 which displays excellent content validity.

Conclusion

The evaluation of content validity is a critical initial stage in the creation of an instrument. Content validity is crucial for assuring the entire validity of an instrument. Thus, content validation entails a systematic method based on research. The content validity of the SLS-TPC for secondary school heads for improving TPC was assessed using CVR, CVI, and Modified Kappa (k*). As a consequence of this procedure, thirty-two items were identified as suitable and relevant, and were incorporated into the SLS-TPC for the next stage of determining the construct validity and reliability process. Therefore, SLS-TPC has a great deal of potential to be encouraged as an improved tool for secondary school heads to improve TPC.

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