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Development and Validation of Perception of Wisdom Exploratory Rating Scale: An Instrument to Examine Teachers' Perceptions of Wisdom

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Abstract: The purpose of this study was to develop and validate the Perception of Wisdom Exploratory Rating Scale based on the Polyhedron Model of Wisdom (PMW). A total number of 585 responses from in-service and preservice teachers was collected. In the EFA, the items fit a seven-factor structure, producing the following subscales: knowledge management, self-regulation, moral maturity, openness, tolerance, sound judgment, and creative thinking. CFA was performed to test the construct validity of the scale. The model produced a good fit to the data (χ^2/df = 1.67, CFI = 0.92, TLI = 0.91, RMSEA = 0.049, and SRMR = 0.06). With continued testing and revisions, this instrument could be useful for the cross-cultural comparison of perceptions of wisdom and identification of barriers to promoting wisdom instruction.

Keywords: wisdom; scale development; teachers' perception

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1. Wisdom

Throughout human history, people from different philosophical traditions, cultures, and religions have considered wisdom as a supreme and valuable concept [1]. Thinking wisely plays a role in any situation that is social in nature [2]. As social beings, social considerations and interactions are common and are often unavoidable in most everyday tasks in the lives of individuals [2]. Some social situations like the current COVID-19 crisis become complex very quickly when diverse interests arise. Furthermore, decisions made by individuals likely yield consequences that affect people outside that interaction [2]. Wisdom's role in balancing diverse interests, immediate and/or lasting consequences, and environmental responses is vital to positive, constructive decision making [3].

Although empirical studies of wisdom in psychology have been conducted only relatively recently, wisdom research has gained in popularity during the last three decades. However, a generally agreed upon definition of wisdom does not exist, and there is significant variation among the definitions and models of wisdom [4,5]. Most researchers refer to wisdom as an aggregate of other components: Balance Theory of Wisdom [3], Berlin Wisdom Paradigm [6,7], and the Three-Dimensional Model of Wisdom [4,8,9]. There have been attempts made with the aim to identify points of consensus on the definitions of wisdom [10–12], however, all such attempts have been conducted in the field of psychology [5,13,14]. Nevertheless, wisdom is an interdisciplinary and complex concept that goes far beyond psychology [15]. Since its reappearance in the scientific literature during the past century, wisdom has been adopted by different scientific communities such as psychology, education, business, neurology, and computer/information science. Therefore, we

broadened these efforts and systematically reviewed articles in psychology, management and leadership as well as education to investigate points of consensus. Based on the review, we offer the Polyhedron Model of Wisdom (PMW) (see Figure 1). We suggest components that characterize wisdom including knowledge, reflectivity and self-regulation, pro-social behaviors and moral maturity, openness and tolerance, critical thinking, intelligence, creativity, and dynamic balance and synthesis [16]. We have discussed and explained all the components using COVID-19 as a context in our previous work [17].

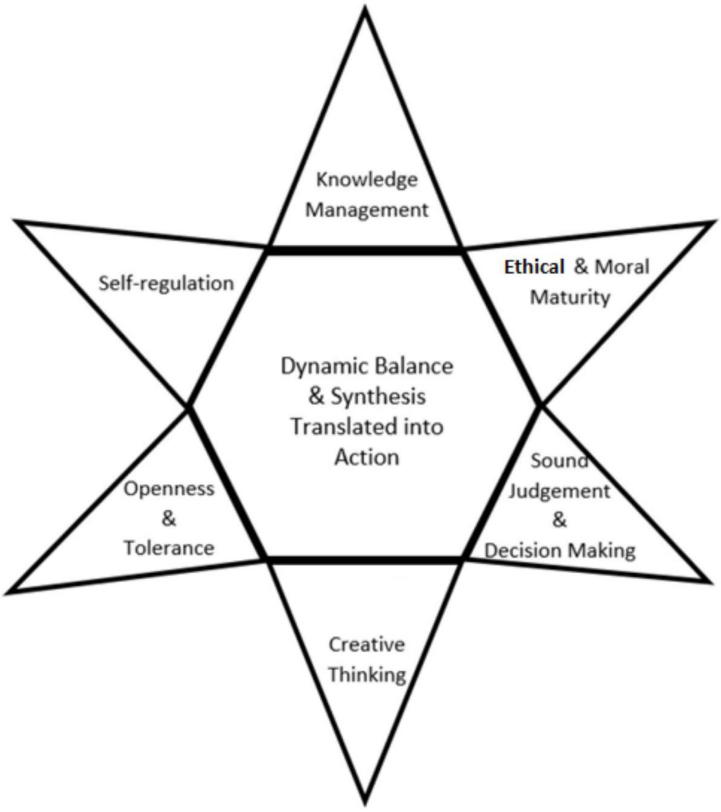

Figure 1. Polyhedron Model of Wisdom.

Wisdom Can Be Fostered

All of the articles in our systematic review stated that acquiring wisdom was a developmental process. In fact, wisdom is more of a process than a product [16]. Among the articles we reviewed, 82% of the authors claimed that wisdom could be taught and fostered, and the others made no such claim [16]. Bruya and Ardelt (2018) reviewed some of the pedagogies that aimed to promote wisdom in the classroom and concluded that wisdom could be taught and fostered in formal education [18]. However, the existing literature on theories of wisdom pedagogy is very limited [19], and many questions remain unanswered regarding fostering and cultivating wise thinking [2]. Researchers have been investigating lay beliefs about wisdom, and lay theories have demonstrated some variability in how wisdom is defined across age groups, professions, cultures, and situations. However, we did not find any study that investigated the teachers' beliefs regarding wisdom [16]. Since the possibility for developing wisdom in the classroom exists, the factors that influence the teachers' commitment to the wisdom development of students become important to understand.

The beliefs, attitudes, and perceptions of teachers regarding constructs affect the educational practices and outcomes [20,21]. How teachers feel or think about wisdom and its components may influence classroom instruction strategies that support wisdom development among learners. For example, a teacher holding misconceptions about

wisdom and its importance may deliberately overlook supporting student development through the inclusion of wise thinking. Thus, the teachers' perceptions are important and integral to the efficacy of any learning program [22]. Teachers bring the different beliefs that they embrace to the classroom. Their beliefs "serve as [an] epistemological base, or a theoretical underpinning, orchestrating cognitive, affective, and behavioral decisions that manifest in the classroom" ([23], p. 106). To this end, it is important to investigate the teachers' beliefs regarding wisdom. An understanding of the teachers' beliefs and their development facilitates an understanding of the disagreements between the teachers' implicit theories of wisdom and explicit theories in the field. It also provides opportunities to promote better teacher preparation and in-service development [24]. Hence, the precise measurement of the teachers' beliefs is a prerequisite to help teachers [23], researchers, policymakers, and teacher-preparation programs foster wisdom. Additionally, teacher belief systems aid teacher education training and professional development by providing foundational research-based knowledge to address and align the educators' personal beliefs, attitudes, and perceptions with the best practice in the field.

2. Purpose of the Study

The purpose of the proposed study was to develop and validate the Perception of Wisdom Exploratory Rating Scale based on the Polyhedron Model of Wisdom. Specific research questions were:

1. To what extent does the POWER Scale demonstrate evidence of content validity?
2. To what extent does the POWER Scale demonstrate evidence of construct validity?
3. What evidence of internal-consistency reliability exists in the data used to develop the POWER Scale?

3. POWER Scale Development

The goal of this study was to develop an instrument to capture the teachers' perceptions of wisdom. We followed the steps of affective instrument design suggested by [25]. The first five steps involve specifying the purpose of the instrument, making sure that no existing instrument serves the same purpose, describing the construct and its dimensions, and then developing final conceptual definitions for each dimension through an extensive literature review. The first five steps of this scale were addressed through a systematic review [16]. In this study, we addressed steps 6 to 14 as follows:

6. Develop operational definitions;
7. Select a scaling technique;
8. Match items back to the dimensions, ensuring adequate content representation on each dimension;
9. Conduct a judgmental review of items;
10. Develop directions for responding; create final pilot version of the instrument;
11. Pre-pilot the instrument with a small number of respondents from the target group and make necessary revisions based on their feedback=;
12. Gather pilot data from a sample that is as representative as possible of the target population;
13. Analyze the pilot data (including factor analysis, item analysis, and reliability estimation);
14. Revise the instrument based on the initial pilot data analysis and re-administer if needed.

4. Operational Definitions

According to the Polyhedron Model of Wisdom, components of wisdom are knowledge management, self-regulation, altruism and moral maturity, openness and tolerance, sound judgment, creative thinking, and dynamic balance and synthesis translated into action. However, the last component, dynamic balance and synthesis translated into action, is different from the other components. Dynamic balance and synthesis translated into action determines the variation of each component depending on the context, situations, and circumstances, which is why we did not include it in this study. In fact, dynamic

balance and synthesis translated into action is a component that needs to be investigated through in-depth interviews. Moreover, while we grouped openness and tolerance in the PMW because they are closely related [26–28], they are different concepts [26,27]. Therefore, we defined them separately and treated them as two different components for this study.

4.1. Knowledge Management

Knowledge management involves applying appropriate knowledge (factual, procedural, conceptual, and meta-knowledge) in a given situation. It also involves adding value to, improving, and advancing the frontiers of knowledge.

4.2. Self-Regulation

Self-regulation refers to the ability to be self-aware and contemplative about the sort of person one is and is becoming, and the kind of personal character that is emerging through one's actions. Self-regulation is the ability to intentionally plan, monitor, revise, and adapt one's behavior, attention, emotions, and cognitive strategies in an attempt to attain personally relevant goals.

4.3. Moral Maturity

Moral maturity includes prosocial behaviors and realizing one's own interests and potentials while at the same time considering the well-being of other people and society mediated by virtue and morality.

4.4. Tolerance of Uncertainty

Tolerance of uncertainty and ambiguity acknowledges that the validity of information available to humans is essentially limited, and that individuals only have access to select parts of reality in which the present and future cannot be fully known in advance. An understanding of such limitations leads to tolerance for unexpected events and the vagueness of situations.

4.5. Openness

Openness involves an openness for and appreciation of values and socio-cultural phenomena that are different from one's own scheme of values and beliefs.

4.6. Sound Judgment

Sound judgement involves purposeful judgment that results in interpretation, analysis, evaluation, and inference as well as an explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. It involves thinking through problematic situations about what to believe or how to act that facilitate the decision-making process.

4.7. Creative Thinking

Creative thinking is the cognitive/affective interaction in which the generation or recognition of ideas, alternatives, or possibilities enhances solving problems, communication with others, and otherwise improves a situation. It is comprised of the capacity to detect gaps, produce novel and useful ideas (fluency, originality), produce alternative ideational categories (flexibility), and introduce details to ideas (elaboration), all the while recombining them, adapting them, and sensing novel relationships among and between ideas.

5. Scale Development Process and Result

The POWER Scale is comprised of seven subscales: knowledge management, self-regulation, altruism and moral maturity, openness; tolerance, sound judgment and decision making, and creative thinking. We constructed a pool of items including 78 items to reflect the seven components of wisdom.

5.1. Establishing Content Validity

To achieve content validation, five eminent experts in the field of wisdom, whom we identified based on their theories and peer-reviewed publications on wisdom, evaluated the preliminary scale. Both qualitative and quantitative feedback were collected simultaneously. Experts were asked to provide qualitative feedback such as suggestions regarding the definition of the dimensions, wording, additional items that could enhance the representativeness of the item pool, and items that needed to be eliminated from the pool [25]. We asked the experts to complete a content-validity form rating the item relevance to each subscale, with 1 representing "not relevant" and 3 representing "very relevant" [25]. Table 1 shows an example of the expert content validation form.

Table 1. Sample form for the expert content validation.

Item	Subscale	Relevance		
Acquiring broad knowledge of the world		1	2	3
Adapting behavior when the situation changes		1	2	3
Considering the well-being of other people and society		1	2	3
Willing to explore ideas with those who have different perspectives and beliefs		1	2	3
Recognizing and considering the need to seek contradictory evidence		1	2	3

After collecting the responses, the items that were not rated 2 or 3 by at least three experts were eliminated from the item pool. Then, we made decisions regarding retaining, eliminating, and rewording items based on the theoretical framework and the experts' qualitative and quantitative feedback. Table 2 shows the list of original items and modifications.

Table 2. POWER Scale content validity based on expert feedback.

Number	Item	Change Reason
	Knowledge Management	
1	Acquiring broad knowledge of the world.	
2	Acquiring specialized forms of knowledge *about the challenge at hand*.	
3	Acquiring experience-based knowledge *in the face of a challenging situation*	
4	Synthesizing knowledge from opposing points of view.	
~~5~~	~~Transferring knowledge into different contexts~~	NR
~~6~~	~~Making intentional effort to advance knowledge~~	NR
7	Knowing how to apply appropriate knowledge *in a given situation*.	
8	Knowing when to apply appropriate knowledge *in a given situation*.	
	Self-Regulation	
1	Knowing oneself	
2	Reflecting on the sort of person they are becoming	
3	Reflecting on what happens around them	
4	~~Adjusting cognitive strategies~~	NR
~~5~~	~~Being aware of the limits of their knowledge~~	O
~~6~~	~~Frequently thinking about connections between their past and present~~	NR
7	Willing to admit one's mistakes	
8	Correcting one's mistakes	
~~9~~	~~Considering the possibility that their beliefs or behaviors may be wrong~~	NR
~~10~~	~~Delaying gratification~~	NR
11	Adapting behavior when the situation changes *appropriate to the specific situation*	
12	Focusing their attention on what's most important at the time	
~~13~~	~~Monitoring their attention~~	O
~~14~~	~~Adjusting their attention when the situation changes~~	NR
~~15~~	~~Considering the possibility that their beliefs or behaviors may be wrong~~	O
~~16~~	~~Adjusting their emotions to the situation at hand~~	O
17	Identifying subtle emotions within oneself	
18	Expressing emotions without losing control *(e.g., showing anger without losing control)*	

Table 2. *Cont.*

Number	Item	Change Reason
	Moral Maturity	
~~1~~	~~Taking on situations where they know their help will be needed~~	NR
2	Treating another person, the way they would like to be treated	
3	Behaving in a manner that also benefits other people rather than just themself	
4	Considering the well-being of other people and society	
5	Understanding moral principles	
~~6~~	~~Considering what is good for humanity in their decisions~~	O
7	Thinking ethically	
~~8~~	~~Understanding ethical rules~~	O
~~9~~	~~Considering virtue as central to their decisions~~	O
	Tolerance for Uncertainty	
1	Considering that the validity of information available to humans could be limited	
2	Understanding that all people have limitations in how much they know	
3	Considering that the future cannot be fully known in advance	
4	Being comfortable with unknown situations	
5	Having tolerance for unexpected events	
	Openness	
~~1~~	~~Respect for~~ Having tolerance for beliefs and actions that are unfamiliar	
~~2~~	~~Respect for~~ Having tolerance for beliefs and actions that may be different from their own	
3	Being curious about other religious and/or philosophical belief systems	
4	Willing to explore ideas *with those who have different perspectives and beliefs*	
~~5~~	~~Reading works that challenge the reader to think differently about issues~~	O
~~6~~	~~Considering differences in points of view~~	NR
~~7~~	~~Considering contrary positions~~	NR
8	Willing to work with people from different backgrounds	
~~9~~	~~Being open to new experience such as food and music~~	O
10	Willing to be around people whose views are strongly different from their *own*	
	Sound Judgment	
1	Incorporating reasonable criteria for judgment	
~~2~~	~~Judging~~*Evaluating* the credibility of an information source	
~~3~~	~~Judging~~*Evaluating* the relevance of an information source	
4	Recognizing differences among opinion, reasoned judgment, and fact	
~~5~~	~~Determining~~*Evaluatin*g whether their assumptions are justifiable	
6	Thinking about different probabilities to improve decision making	
7	Recognizing and considering the need to seek contradictory evidence	
8	*Perceiving possible compromises between opposing positions*	A
9	Considering the context in which they are making a judgment	
~~10~~	~~Making risk-benefit ratio assessments~~	O
~~11~~	~~Raising vital questions and problems clearly and precisely~~	NR
~~12~~	~~Generating a reasoned method for selecting between several possible courses of action~~	O
~~13~~	~~Presenting a coherent and persuasive argument on a controversial topic~~	NR
~~14~~	~~Identifying their assumptions clearly~~	O
~~15~~	~~Determining~~*Evaluating* the consistency and relevance of the conclusion	
	Creativity	
1	Generating unique and novel ideas	
2	Elaborating on ideas by adding details	
3	Seeing relationships among ideas	
4	Synthesizing and recombining ideas to improve the solution	
5	Having an ability to sense when problems are about to arise	
~~6~~	~~Having a problem-sensitivity attitude~~	NR
~~7~~	~~Generating useful ideas~~	O
~~8~~	~~Generating many ideas~~	NR

Table 2. *Cont.*

Number	Item	Change Reason
~~9~~	~~Making new connections among ideas~~	O
~~10~~	~~Generating different categories of ideas~~	NR
~~11~~	~~Having a risk-taking attitude~~	NR
~~12~~	~~Using analogies to make the unfamiliar known~~	NR
~~13~~	~~Defining a problem in multiple ways and from different viewpoints~~	NR

Note. O: Item eliminated because it overlapped with other items. NR: Item eliminated because the item was not relevant to the component. A: Item was added based on the experts' suggestions. Strikethrough was used for items or words eliminated and italics for words or items added.

5.2. Pilot Study

After revising the questions, the first author created the Qualtrics questionnaire with the remaining 40 items. Items were randomized from different specific content categories to reduce the occurrence of bias associated with survey item categories. Six senior graduate students with K–12 teaching experience took the survey to ensure that the instructions and language in the scale were clear and appropriate, without obvious errors or omissions [25]. We also assessed the approximate duration of the survey, which took an average response time of about 20 min for completion. In a follow-up cognitive interview, we discussed the clarity of the directions and the appropriateness of the response scales. We asked the participants to identify any confusing or unclear items [25]. Items were revised based on the participants' feedback. One of the most frequent suggestions was not to intersperse the items. As some of the items within particular categories were related and even similar, intermixing them caused confusion or impeded comprehension. Hence, all items related to each category were blocked together. Items related to tolerance and openness were put in one block. To avoid bored or biased responses to particular categories, blocks were randomly presented in different orders to different participants. In other words, different participants took the survey in different block order. The final instrument consisted of 40 items at this point.

5.3. Participants

A total number of 583 responses were collected (Table 3). In-service teachers were recruited through gifted education organization listservs and through email communication with local school districts. A total of 365 in-service teachers completed all the survey questions. By gender, 84% of teachers self-identified as female. The racial-ethnic diversity of the sample resembled the U.S. public-school teacher demographics with 89% of participants identifying as White. Additionally, 24% of teachers had a Bachelor's degree, 70% had a Master's degree, and 3% a doctorate. The preservice teacher sample consisted of 218 teacher education undergraduates from a Midwestern University. The majority of preservice participants were female (86%). As expected, 68% of the participants were younger than 21. Like in-service teachers, 86% of preservice teacher participants were White. Other demographics included: Asian (4%) and Black (2%) Participants who completed the survey were entered into a draw for one of twenty USD$40 Amazon gift cards. Preservice teachers were compensated with extra-credit points allocated by head professors in participating courses.

5.4. Procedure

Participants were asked to complete an online survey including the 40 items. Respondents were asked to help us understand how they perceived wisdom and what characteristics they thought were necessary to consider someone as wise. The survey did not ask if the participants considered themselves to be wise, but based on their personal understanding of wisdom, we asked them to rate the importance of each item that characterized wisdom. We used a 6-point scale, with the following response options: 1 (Unimportant), 2 (Not very Important), 3 (Moderately Important), 4 (Important), 5 (Very important), and 6 (Essential).

Six points can usually be treated as continuous indicators and provide the maximum number of scale points that are differentiable and cover the entire measurement continuum [25]. The 6-point level of importance response scale was consistently used throughout the survey as it made it simple and clear for the respondents who had to respond to all items.

Table 3. Participant demographic.

Variable	In-Service Teachers Frequency		Preservice Teachers Frequency
Gender			
Female	305 (84%)		187 (86%)
Male	59 (16%)		31 (14%)
Agender	1 (>1%)		0 (0%)
Ethnicity			
White	315 (86%)		188 (86%)
Black	11 (3%)		5 (2%)
White, Other	12 (3%)		7 (3%)
Asian	7 (2%)		8 (4%)
Latino	4 (1%)		0 (0%)
Native Hawaiian or Pacific Islander	2 (>1%)		1 (>1%)
Preferred not to answer	11 (3%)		2 (>1%)
Other	3 (>1%)		7 (3%)
Age Group			
Younger than 21	0 (0%)		149 (68%)
21–24	10 (3%)		67 (31%)
25–34	88 (24%)		1 (>1%)
35–44	87 (24%)		1 (>1%)
45–54	102 (28%)		
54 or older	74 (20%)		
Prefer not to answer	4 (1%)		
Education			
Bachelor's degree	86 (24%)	Freshman	24 (11%)
Master's degree	257 (70%)	Junior	71 (33%)
Doctoral degree	11 (3%)	Senior	44 (20%)
Professional degree	11 (3%)	Sophomore	79 (36%)

Note: In-service teachers n = 365; preservice teachers n = 218.

5.5. Sample Size and Data Screening

In-service and preservice samples were randomly split into two halves for EFA (n = 290) and CFA (n = 295). After splitting the data into two halves, we examined the accuracy of data entry, missing values, outliers (using Mahalanobis Distance, Cook's Distance (gCD)), multicollinearity (using Variance Inflation Factor, Tolerance Values, and Squared Multiple Correlations), and singularity within both halves. Normality was reviewed through all four groups of normality tests: Chi-squared plot, Mardia's tests of Skewness and Kurtosis, Doornik–Hansen's omnibus tests, and HenzeZirkler [29], which indicated that the data were non-normal (See Table 4). As SPSS does not provide these tests, we used Stata 16 to conduct these analyses.

Table 4. Test of normality and skewness.

Test	EFA Sample (n = 280)	CFA Sample (n = 284)
Mardia		
Skewness	28,376.919 *	21,469.257 *
Kurtosis	51.94259 *	2113.769 *
Doornik–Hansen	(df = 92) 996.496 *	(df = 84) 710.787 *

* p value < 0.001.

After removing the outliers, the samples included 280 observations for EFA and 284 for CFA. We checked the Kaiser–Meyer–Olkin test of sampling adequacy (KMO) to

ensure sampling adequacy. KMO was greater than 0.90, which is considered adequate [30] (see Table 5).

Table 5. KMO and Bartlett's Test.

Kaiser–Meyer–Olkin Measure of Sampling Adequacy.		0.902
Bartlett's Test of Sphericity	Approx. Chi-Square	8429.395
	df	1035
	Sig.	0.001

5.6. Exploratory Factor Analysis

To assess the construct validity and the initial factor structure of the POWER Scale, we conducted EFA using SPSS. In this process, we evaluated the number of factors to be extracted using three methods: Eigenvalues greater-than-one rule (EV > 1) [31], minimum average partial correlation [32], and parallel analysis [33,34]. Based on the suggested number of factors and the quality of our data, we conducted factor extraction and factor rotation to adjust the initial solution.

5.6.1. Number of Factors

Principal-axis factoring Eigenvalues suggested a seven-factor model. While a popular method, the Eigenvalues-greater-than-one rule can overestimate or underestimate the correct number of factors to retain, and sometimes underestimates the number of components [35]. We conducted the MAP test to confirm the suggested number of factors. The MAP technique has been shown to perform quite well in determining the number of factors to retain in multiple simulation studies [36,37]. By examining a series of matrices of partial correlations, components are maintained if the variance in the correlation matrix represents systematic variance, as opposed to residual or error variance [32]. As more components are partialed out, the average squared partial correlation decreases. The smallest MAP was 0.0142, which suggests a 6- or 7-factor model. According to the revised MAP test partial correlation, the smallest average 4th power partial correlation was 0.0008, which suggested a 7-factor model. Finally, we performed parallel analysis on SPSS [38]. To decide on the number of factors, we compared the raw data eigenvalues with eigenvalues generated from a random dataset with the same number of cases and variables. The number of factors was determined using the 95th percentile generated eigenvalue column [34,39,40]. The parallel analysis indicated that the lowest eigenvalue for a factor to be retained in the solution should be greater than 1.02, the smallest eigenvalue greater than 1. According to the original solution from the principal-axis factoring, seven factors had eigenvalues greater than this number. Table 6 shows the extraction strategies.

5.6.2. Determining the Extraction Technique

Whereas it is advised to use different extraction techniques to assess the outcomes from different methods [41], the EFA results obtained with different extraction methods are often remarkably similar [42]. Considering the sample size and non-normality of our data, we determined that the Unweighted least squares (ULS) was the most appropriate extraction model for our data [43]. The ULS estimation method makes no assumptions regarding the observed variable distributions and many variables, and is adequate for small sample sizes [41].

5.6.3. Determining Extraction Rotation Method

There is no ultimate answer in terms of selecting the "best rotation" criterion. However, certain rotation criterion works better for certain phases of instrument validation [44]. For example, rotation criteria that attempt to reduce cross-loading magnitudes such as Geomin or Quartimax should result in more comparable solutions to CFA. Such rotations are preferable for use with well-developed measures in which researchers expect fewer and smaller cross-loadings [44]. Because this is a new measure, we followed the suggestion

by Schmitt and Sass to consider a rotation that is better suited for complex data structures such as Equamax and Facparsim. Such rotations are preferred when the quality of the items could be questionable due to limited prior structural validity and reliability evidence. Because this is a new instrument, it is possible that some items can measure multiple factors, therefore, we sought to remove items with larger cross-loadings to reduce the interfactor correlation. This simplifies variable and factor pattern matrix loadings and spreads variances more equally across the factors providing a clean solution. Therefore, we used the Equamax rotation method as it is more appropriate for use in instrument development [44].

Table 6. Factor extraction strategies.

Method 1				Method 2			Method 3		
Number of Factors	**Total**	**% Variance**	**Cumulative %**	**Number of Factors**	**MAP Squared Correlation**	**Power 4**	**Root**	**Means**	**95th Percentile**
1	14.469	31.453	31.453	0	0.1063	0.1940	1	1.05	1.16
2	3.450	7.500	38.953	1	0.0257	0.0032	2	0.95	1.02 [3]
3	2.029	4.412	43.365	2	0.0193	0.0020	3	0.88	0.93
4	1.835	3.989	47.354	3	0.0180	0.0015	4	0.82	0.87
5	1.496	3.253	50.607	4	0.0173	0.0012	5	0.76	0.80
6	1.388	3.018	53.625	5	0.0158	0.0010			
7 [1]	1.213	2.637	56.262	6	0.0149	0.0009			
8	0.854	1.856	58.118	7	0.0142 [2]	0.0008			
9	0.758	1.648	59.766	8	0.0142	0.007			
10	0.640	1.390	61.156						

[1] Eigenvalues from raw data applying >1 rule of thumb, 7 factors. [2] Minimum average partial correlation MAP, 7 factors. [3] Parallel analysis, Eigenvalues generated from the simulated data, 7 factors.

5.6.4. Determining the Item Retention

Items with loadings below 0.4, crossloading items with values $\geq$0.32 on at least two factors, and items that load on two factors with absolute difference $\geq$0.30 were deleted (see Appendix A). Twelve items were deleted through EFA. The final EFA model explained 65.10% of the variance in the data (Table 7). Appendix B shows the detailed item scores and distributions.

5.7. Reliability

We evaluated the internal-consistency estimates of the data for each subscale using McDonald Omega (ω). This reliability estimate ensures accuracy in the consistency of each subscale, with the estimated confidence intervals [45]. The ω estimates ranged from 0.74 to 0.88, so they exceeded the minimum recommended reliability estimate of 0.70 [25].

5.8. Confirmatory Factor Analysis

After establishing the preliminary evidence of the factor structure using EFA, CFA was used to test the construct validity of the POWER Scale. Due to the non-normality of our data, small sample size, and the nature of the ordinal variables, we performed CFA in the R package lavaan [46] using the diagonally weighted least squares (DWLS) estimator and robust SEs [47–49]. To assess the model quality, we followed the well-established fit-indices: (a) χ^2 statistic (χ^2/df) with values below 3 represent a good model [47], (b) the Comparative Fit Indexcomparative fit index (CFI) and Tucker–Lewis Index (TLI) values greater than 0.9 are indicative of an acceptable fit, (c) the Root Mean Square Error of Aproximation (RMSEA) values should be less than 0.05, and (d) the Standardized Root Mean Square Residual (SRMR) should be less than 0.08 [50,51]. The CFA model fit was adequate (Table 8).

Table 7. Final model from the ULS Equamax rotated factor matrix.

	1	2	3	4	5	6	7	Omega ω (SE)	[95% CI]
Know1	0.46							0.74 (0.02)	[0.68, 0.79]
Know2	0.73								
Know3	0.74								
Know5	0.43								
Creat1		0.68						0.79 (0.02)	[0.72, 0.83]
Creat2		0.78							
Creat3		0.55							
Creat4		0.56							
Self1			0.62					0.85 (0.01)	[0.71, 0.88]
Self2			0.67						
Self3			0.58						
Self4			0.65						
Self5			0.64						
Self6			0.46						
Self9			0.44						
Prosoc1				0.70				0.87 (0.01)	[0.83, 0.90]
Prosoc2				0.81					
Prosoc3				0.78					
Prosoc4				0.65					
Prosoc5				0.71					
Toler1					0.75			0.81 (0.02)	[0.74, 0.85]
Toler2					0.72				
Toler3					0.72				
Openn2						0.52		0.83 (0.02)	[0.78, 0.86]
Openn4						0.60			
Openn5						0.78			
Openn6						0.70			
Judg1							0.59	0.88 (0.01)	[0.85, 0.90]
Judg2							0.61		
Judg5							0.66		
Judg6							0.56		
Judg8							0.57		
Judg9							0.70		
Judg10							0.70		

Table 8. CFA Model Fit Indices for the 7-factor solution model as specified by the EFA.

Model Description	χ2	df	χ2/df	CFI	TLI	RMSEA (95% CI)	RMSEA (95% CI)	SRMR
Improved Seven-Factor Model Using DWLS (Robust)	973.192 *	506	1.92	0.99	0.99	0.057	0.052, 0.063	0.062

* p value < 0.001.

Table 9 shows the CFA solution with standardized coefficients.

All the correlations among subscales were less than 0.70 (see Table 10). The final Scale's items fit a 7-factor extraction, producing seven subscales with items loading on the intended factor and only on the intended factor, indicating the unidimensionality of each subscale. Each subscale showed good reliability and inter-item correlations without being too highly correlated. The graphical model of the POWER scale is presented in Appendix C.

Table 9. CFA solution.

Item	Standardized	DWLS	[95% CI]	
	Coefficients	Std. Err.		
Know1	0.70	0.02	0.66	0.74
Know2	0.77	0.02	0.74	0.81
Know3	0.75	0.02	0.72	0.79
Know5	0.78	0.02	0.74	0.82
Creat1	0.73	0.02	0.70	0.77
Creat2	0.78	0.02	0.74	0.82
Creat3	0.76	0.02	0.72	0.79
Creat4	0.90	0.02	0.86	0.93
Self1	0.71	0.02	0.68	0.75
Self2	0.77	0.02	0.74	0.80
Self3	0.80	0.02	0.76	0.83
Self4	0.77	0.02	0.74	0.81
Self5	0.76	0.02	0.73	0.80
Self6	0.75	0.02	0.71	0.78
Self9	0.72	0.02	0.69	0.76
Prosoc1	0.78	0.02	0.75	0.81
Prosoc2	0.93	0.01	0.90	0.95
Prosoc3	0.94	0.01	0.91	0.97
Prosoc4	0.92	0.01	0.89	0.95
Prosoc5	0.92	0.01	0.90	0.95
Tolera1	0.77	0.02	0.72	0.81
Tolera2	0.77	0.02	0.73	0.81
Tolera3	0.90	0.02	0.85	0.94
Openn6	0.83	0.02	0.80	0.86
Openn2	0.85	0.02	0.82	0.88
Openn4	0.81	0.02	0.78	0.84
Openn5	0.84	0.02	0.81	0.87
Judg1	0.74	0.02	0.71	0.78
Judg2	0.78	0.02	0.75	0.81
Judg5	0.78	0.01	0.75	0.81
Judg6	0.84	0.01	0.81	0.87
Judg8	0.81	0.01	0.78	0.84
Judg9	0.84	0.01	0.81	0.87
Judg10	0.88	0.01	0.85	0.91

Note. All estimates were significant at $p < 0.001$.

Table 10. Correlations among subscales for the Confirmatory Factor Analysis.

Subscale	1	2	3	4	5	6	7
1. Knowledge	1.00						
2. Creativity	0.64	1.00					
3. Self-Regulation	0.56	0.54	1.00				
4. Moral Maturity	0.36	0.51	0.58	1.00			
5. Tolerance	0.35	0.34	0.39	0.43	1.00		
6. Openness	0.63	0.64	0.61	0.55	0.50	1.00	
7. Judgment	0.65	0.54	0.55	0.53	0.52	0.70	1.00

Note. All estimates were significant at $p < 0.001$.

6. Discussion

Models of wisdom need to evolve and be tested against empirical evidence [13,19]. This study provided important empirical evidence for PMW. Building scales advances theory development and contributes to understanding the concepts, constructs, and the relationships among them [52]. Additionally, since wisdom can be developed in the classroom, validating the POWER Scale adds evidence suggesting that the PMW model can be used to measure and understand the perceptions of wisdom of preservice and in-service

teachers. This is a powerful step to prepare and enable teachers to integrate wisdom in their classrooms. As a result, the teachers' existing knowledge, beliefs, and attitudes should be further studied. In fact, many reform efforts in the past have been ineffective because they failed to take the teachers' existing knowledge, beliefs, and attitudes into consideration [53]. The POWER Scale can help provide insights into the prerequisites for professional development programs that can support how teachers foster wisdom in the classroom.

Through EFA, we found evidence to support the internal structure of the POWER Scale. This result supports the underlying seven distinct, latent factors that were addressed by POWER Scale items and proposed in the PMW [54]. This 7-factor model was then further evaluated using CFA methods, which further supported the 7-factor model with 34 items. The findings of this study challenged the PMW and made us rethink and illustrate some theoretical components [16,54] as well as help us address operational definitions and consider future modifications to the PMW and its applications. Some overlap existed in operational definitions. For example, during the EFA, we addressed nuanced similarities between knowledge management and sound judgment. For example, knowledge item 4 'Synthesizing knowledge from opposing points of view' was loaded on sound judgment. We then decided that considering contrary points of view was related to sound judgment. Hence, we refined the definitions of each component of the PMW to reduce overlaps and confusion.

Limitations and Future Directions

Developing an instrument is an ongoing process [54]. This is the first step I the development and validation of the POWER Scale. The scale will be revised and tested based on the results of this study. The main limitation of this study was splitting the dataset into two randomly selected subsamples. Despite being a common practice in validation studies across different fields, it is not without problems. We collected the data at the same time because of time limits. Hence, we did not have a chance to modify the items before conducting the CFA. For example, tolerance and openness were the most problematic components. Two questions from each factor were loaded on both factors. There might be two possible explanations for these cross-loadings. It is possible that the participants might have been confused due to the similarities in the format and content of the items. For example, the item in tolerance for ambiguity question 'Having tolerance for unexpected events' was similar to an openness item 'Having tolerance for beliefs and actions that are unfamiliar.' Self-regulation was another subscale that would have benefited from modifications before CFA. The item 'focusing their attention on what is most important at the time' referred to setting goals, but was not clear enough. Adding items could have benefited the scale by providing more nuance to the goal setting aspect of self-regulation.

We had a restriction of range in the responses and the data were negatively skewed. This means that teachers did not use the full 6-point scale. There are two possible explanations for the skewness and kurtosis of our data. First, one of the limitations of this study was using convenience sampling. The teachers who decided to donate their time to this research project were a self-selecting group who truly valued wisdom; teachers who were uninterested or who did not value wisdom may have not volunteered to complete the survey. An additional possibility is that the teachers responded in a socially expected manner. In other words, teachers may have given socially desirable responses instead of choosing responses that were reflective of their true beliefs. Either of these conditions would result in negatively skewed responses and require further investigation.

Although participants in the cognitive interview considered that intermixing the items was extremely confusing and distracting, it is possible that item blocking of the scale influenced the responses [55]. Randomizing items from different categories may help reduce the occurrence of possible response biases [55]. However, Sparfeldt et al. (2006) found that there was little or no effect of item blocking on the factorial structure, psychometric properties, and scale means [56]. Moreover, item blocking also improved the respondents'

attention and motivation [57,58]. Maintaining the respondents' attention and motivation was important due to the large number of items on the instrument. We only conducted cognitive interviews for in-service teachers. Thus, we could not assess whether there were different understandings of the items between the two groups in the sample. Personal interpretation could be an explanation for some of the constructs with large variation. Whereas the in-service teacher sample was geographically diverse, undergraduates primarily came from the same institution. Similarly, due to the resemblance to national teacher demographics, our studied group relied primarily on responses from female and White participants. Future research should consider the intentional inclusion of diverse participants. Moreover, studies could evaluate whether the POWER Scale yields invariant results across preservice and in-service teachers, and across demographic characteristics (ethnicity, gender, age). Although research suggests that understanding the perceptions of preservice and in-service teachers is pivotal to understanding teacher instruction [21,22], it is possible that the preservice and in-service teachers' beliefs regarding wisdom differ due to years of experience and the quality of teaching experiences. This nuanced analysis could shed light on differential support via training for teacher preparation programs and PD for in-service teachers. However, following prior studies on the lack of association between wisdom and age [7,14], we did not consider age differences to be a deterrent to collecting data from preservice and in-service teachers.

The POWER Scale aims to explore teachers' implicit beliefs about wisdom that affect their ability to teach wisdom in their classrooms. Therefore, it is necessary to conduct a mixed-methods study incorporating the POWER Scale as well as in-depth interviews to investigate the teachers' implicit beliefs of wisdom in different cultures and contexts. Outcomes from the results will enable a cross-cultural comparison of wisdom and the identification of barriers to promoting wisdom instruction. Teaching and cultivating wisdom in educational settings can be accomplished, but the teachers' attitudes toward such endeavors are critical. The teachers' perceptions are one of the determining factors affecting the efficacy of a learning program. Future studies of the POWER Scale could highlight areas to support preservice and in-service teachers through professional development. A need exists for the development of empirically grounded interventions with the aim to promote wisdom-related processes in schools, work settings, and daily life [59]. Based on the PMW, researchers can design and validate interventions and curriculum that promote wisdom in the classroom. There is potential to create online and face-to-face workshops for preservice and in-service teachers to address the misconceptions about wisdom and methods to promote it in their classrooms. Finally, the POWER Scale needs to be tested in other professional populations in various fields and contexts. Multidisciplinary applications of the PMW may reduce the misconceptions about wisdom in society at large. By identifying the importance of wisdom in relation to fields such as education, management and leadership, and STEM, perhaps wisdom research can have a greater impact on the pursuit of the common good.

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Appendix A. Changes during Exploratory Factor Analysis

Item	Reason for Deletion
Knowledge Management	
Acquiring broad knowledge of the world.	
Acquiring specialized forms of knowledge about the challenge at hand.	
Acquiring experience-based knowledge in the face of a challenging situation	
~~Synthesizing knowledge from opposing points of view.~~	C
Knowing how to apply appropriate knowledge in a given situation.	
~~Knowing when to apply appropriate knowledge in a given situation.~~	C
Self-Regulation	
Knowing oneself	
Reflecting on the sort of person they are becoming	
Reflecting on what happens around them	
Willing to admit one's mistakes	
Correcting one's mistakes	
Adapting behavior appropriate to the specific situation	
~~Focusing their attention on what's most important at the time~~	C
~~Identifying subtle emotions within oneself~~	C
Expressing emotions without losing control (e.g., showing anger without losing control)	
Moral Maturity	
Treating another person, the way they would like to be treated	
Behaving in a manner that also benefits other people rather than just themself	
Considering the well-being of other people and society	
Understanding moral principles	
Thinking ethically	
Tolerance for Uncertainty	
Considering that the validity of information available to humans could be limited	
Understanding that all people have limitations in how much they know	
Considering that the future cannot be fully known in advance	
~~Being comfortable with unknown situations~~	C
~~Having tolerance for unexpected events~~	C
Openness	
~~Having tolerance for beliefs and actions that are unfamiliar~~	C
Having tolerance for beliefs and actions that are different from their own	
~~Being curious about other religious and/or philosophical belief systems~~	C
Willing to explore ideas with those who have different perspectives and beliefs	
Willing to work with people from different backgrounds	
Willing to be around people whose views are strongly different from their own	
Sound Judgment	
Incorporating reasonable criteria for judgment	
Evaluating the credibility of an information source	
~~Evaluating the relevance of an information source~~	C
~~Recognizing differences among opinion, reasoned judgment, and fact~~	C
Evaluating whether their assumptions are justifiable	
Thinking about different probabilities to improve decision making	
~~Recognizing and considering the need to seek contradictory evidence~~	C
Perceiving possible compromises between opposing positions	
Considering the context in which they are making a judgment	
Evaluating the consistency and relevance of the conclusion	

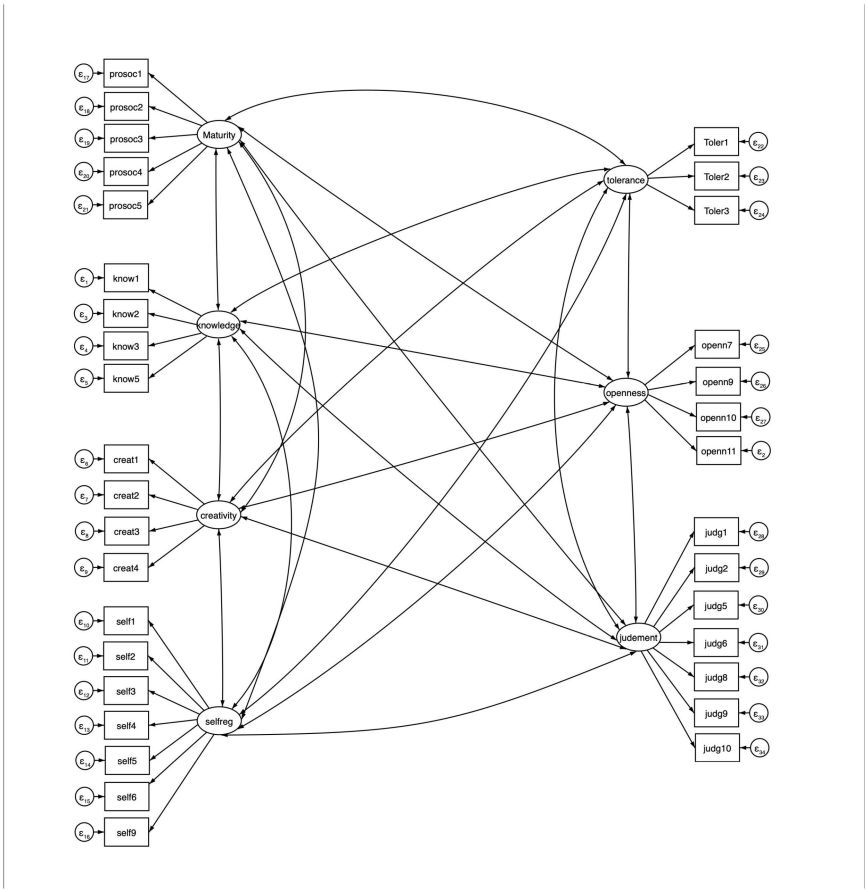
Item	Reason for Deletion
Creativity	
Generating unique and novel ideas	
Elaborating on ideas by adding details	
Seeing relationships among ideas	
Synthesizing and recombining ideas to improve the solution	
~~Having an ability to sense when problems are about to arise~~	C
C: Item deleted because of high crossloadings	

Appendix B. Descriptive Statistics of the Items Retained in the Scale after EFA

Item	Mean	Mean	Standard Deviation	Standard Deviation	Response Percentage					
					1	2	3	4	5	6
Know1	4.87	4.93	0.91	0.90	0.0	0.4	5.4	30.0	35.4	28.9
Know2	4.72		0.91		0.0	0.7	6.8	34.3	36.4	21.8
Know3	4.88		0.91		0.4	0.4	5.0	26.8	40.0	27.5
Know5	5.27		0.80		0.0	0.4	0.7	17.9	33.2	47.9
Creat1	4.32	4.70	1.02	0.91	0.0	5.4	13.2	37.9	31.4	12.1
Creat2	4.46		0.96		0.0	3.2	12.1	32.5	40.0	12.1
Creat3	5.03		0.83		0.0	3.2	12.1	32.5	40.0	12.1
Creat4	4.99		0.84		0.0	0.4	3.2	20.7	44.3	31.4
Self1	5.08	5.17	0.86	0.87	0.0	0.7	3.2	21.8	45.4	28.9
Self2	5.15		0.89		0.0	0.0	5.7	16.1	42.5	35.7
Self3	5.16		0.83		0.0	0.0	5.7	15.7	36.4	42.1
Self4	5.43		0.78		0.0	0.0	3.9	15.4	41.1	39.6
Self5	5.26		0.82		0.0	0.0	2.5	10.4	28.6	58.6
Self6	5.04		0.81		0.0	0.4	2.9	20.0	46.1	30.7
Self9	5.04		1.03		0.7	0.7	8.2	15.4	34.6	40.4
Prosoc1	5.00	5.25	1.15	0.93	1.1	3.2	6.4	16.8	29.3	43.2
Prosoc2	5.13		0.98		0.0	1.1	6.8	15.0	32.5	44.6
Prosoc3	5.32		0.89		0.0	1.1	2.1	15.7	26.1	55.0
Prosoc4	5.36		0.82		0.0	0.4	3.2	10.0	32.5	53.9
Prosoc5	5.42		0.82		0.0	0.4	3.2	9.3	28.6	58.6
Tolera1	4.46	4.53	1.11	1.15	1.8	2.9	11.1	34.6	30.7	18.9
Tolera2	4.55		1.21		2.1	3.6	11.1	28.6	29.3	25.4
Tolera3	4.58		1.13		1.1	2.9	12.9	27.1	32.1	23.9
Openn2	5.11	5.13	0.89	0.92	0.0	0.4	4.3	18.9	36.4	40.0
Openn4	5.12		0.96		0.0	0.7	6.8	16.1	32.9	43.6
Openn5	5.29		0.90		0.0	0.4	4.6	13.9	27.9	53.2
Openn6	5.02		0.94		0.0	1.1	5.0	21.8	35.4	36.8
Judg1	4.93	5.03	0.91	0.87	0.0	1.1	5.0	21.8	35.4	36.8
Judg2	5.26		0.82		0.0	0.7	6.1	22.5	41.1	29.6
Judg5	4.99		0.87		0.0	2.9	15.0	35.4	46.8	31.1
Judg6	4.91		0.89		0.0	0.0	5.7	27.1	37.1	30.0
Judg8	4.95		0.88		0.0	1.1	5.4	18.9	46.8	27.9
Judg9	5.10		0.84		0.0	0.7	2.5	19.3	41.4	36.1
Judg10	5.05		0.88		0.0	0.7	3.6	21.4	38.6	35.7

n = 280

Appendix C. Graphical Model of the POWER Scale after CFA



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