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Unveiling Pre-Service Teachers' Epistemological Beliefs in the Planning of Korean Language Assessment

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I. Introduction

Epistemological beliefs, encompassing individuals' perspectives on knowledge and learning, exert a profound influence on various aspects of daily life. Rooted in education and life experiences, these beliefs not only determine the certainty, source, and structure of knowledge but also influence the individual's ability and speed in acquiring knowledge (Hofer & Pintrich, 1997; Schommer, 1994; Schommer-Aikins, 2004). Especially in the educational field, understanding teachers' epistemological beliefs becomes crucial for shaping and enhancing the teaching and learning process, considering such beliefs are shaped by accumulated experiences (Penner-Williams et al., 2019; Yilmaz & Sahin, 2011). Given the abundant evidence indicating that the uptake in teaching practices and professional learning are influenced by epistemological beliefs (Atlı & O'Dwyer, 2021; Schommer-Aikins, 2004; Yilmaz & Sahin, 2011), understanding pre-service teachers' underlying beliefs is essential for providing effective teacher education.

While international research on pre/in-service teachers' epistemological beliefs about teaching and learning in (inter)disciplinary subjects has been extensively covered in the literature (e.g., Lunn

Brownlee et al., 2017; Maggioni & Parkinson, 2008; Soleimani, 2020; Viholainen et al., 2017; Yilmaz & Sahin, 2011), there is a noticeable gap in national studies in Korea. To address the gap in the lack of research on teachers' epistemological beliefs in national studies, this study aims to explore the epistemological beliefs of pre-service teachers, with a specific focus on Korean language education (KLE).[1] Through an examination of performance assessment task planning by pre-service teachers, this study aims to identify their perspectives and conceptions expressed in their assessment task. The task focuses on one of the KLE standards, emphasizing the exploration of various perspectives in constructing knowledge and expressing ideas in language (Ministry of Education, 2022).

Given the profound connection between teachers' epistemological beliefs and their teaching practices, pre-service teachers need to be exposed to constructivist teaching that allows them to construct or reconstruct their beliefs about teaching (Yilmaz & Sahin, 2011). The emphasis on pre-service teachers is particularly significant, considering they are in a formative stage, developing their teaching philosophies and methodologies (Ketabi et al., 2014; Park, 2018a). This process is evident in the task design within an assessment context, revealing their understanding of knowledge (Jang & Kwon, 2019). By understanding how these beliefs shape their teaching practices (i.e., approaches to assessment tasks in KLE), this study stands at the intersection of educational philosophy and practical application.

To lay the groundwork for more informed and impactful educational practices and to form the foundation for an educational philosophical approach, the study is structured around the following research questions: (1) What are the epistemological beliefs of pre-service teachers regarding teaching practices?, (2) How do pre-service teachers approach the planning of performance assessment tasks?,

1 In this study, Korean Language Education refers to native language instruction targeting learners who use Korean as their first language.

and (3) How do task planning patterns vary among pre-service teachers depending on their epistemological beliefs?

II. Literature Review

1. Epistemological beliefs of pre-service teachers in Korea

In the field of education research, the variation in classroom practices among teachers, despite similar pre-service training has been a topic of interest (Campbell et al., 2004). One factor influencing these practices is the concept of epistemological beliefs, initially introduced by Perry (1968) and refined by Schommer (1990) across five dimensions. These dimensions encompass certainty of knowledge (ranging from absolute certainty to tentative beliefs), the structure of knowledge (from simple to complex), the source of knowledge (whether it comes from authority or reason), ability to acquire knowledge (whether learning ability is fixed or can be changed), and control of knowledge (whether knowledge is acquired quickly or gradually).

Epistemological beliefs, as conceptualized by Schommer (1990, 1993), refer to beliefs about knowledge and learning shaped through education and life experiences. These encompass not only the certainty, source, and structure of knowledge but also beliefs about one's ability and speed in acquiring knowledge. Moreover, epistemological beliefs signify crucial personal tendencies influencing cognitive processes (Hofer & Pintrich, 1997). Extensive research dating back to the 1990s and including recent studies by scholars such as Yadav & Koehler (2007), Newell et al. (2014), Bock & Erickson (2015), Ubaque-Casallas & Aguirre-Garzón (2020), and Mpofu (2021) have explored various aspects of language and literacy teachers' epistemology. In national studies, epistemological beliefs have been explored in a limited way in the context of curriculum and instruction and

subject-focused such as science education (Cho & Yang, 2008; Jo et al., 2009; Kim & Yeo, 2022; Oh & Lee, 2013; Sung et al., 2020).

Despite the wealth of research in this area, there remains a significant gap in understanding the epistemological beliefs of pre-service teachers and the impact of those beliefs on teaching practices within the unique context of KLE in Korea. This study delves into the beliefs of pre-service teachers regarding their teaching of KLE by exploring how those beliefs shape or regulate their planning of performance assessment tasks, extending beyond considerations of classroom management in general instructional practices. Specifically, within the context of KLE, a refined interpretation of epistemic autonomy is proposed in language aspects, acknowledging that the expression's ability to choose perspectives extends beyond a singular dimension. In the context of task design in KLE performance assessment, epistemological beliefs manifest in complex ways that necessitate a more intricate understanding than conventional models offer. By rethinking the epistemological dimensions in the KLE context, this study contributes to a more nuanced understanding of how pre-service teachers navigate and conceptualize their epistemic beliefs, providing valuable insights for both research and pedagogical practice.

2. Performance assessment tasks in KLE

Recently, there has been a heightened emphasis on performance assessment that continuously observes students, enabling practical evaluation and moving beyond the traditional Korean language assessment that prioritizes objectivity and fairness. According to Ministry of Education (1998), performance assessment was introduced to implement a constructivist and holistic evaluation. In particular, performance assessment in KLE can determine individual language proficiency through the experience of engaging with tasks. Well-designed assessments provide teachers with diverse and valuable information as they entail comprehensive analysis of the process and results of

language performance as well as learners' cognitive and affective aspects.

Wolf (1993) proposed various variables that influence the application and outcomes of performance assessment in language education. These include teachers' competence as assessment experts, the creation of an environment with systematically observable task conditions, utilization of diverse assessment methods and contexts, evaluation of language improvement over time, task settings that reflect the reality of language use, and the collection and recording of meaningful student results (Cheon, 1999). Planning performance assessments in a constructivist manner that aligns with the intended evaluation purpose requires teachers to consider and incorporate various factors (Ryu et al., 2021). However, according to Lee (2008), KLE is reported as one of the subjects where teachers in Korea feel the most difficulty when planning and conducting performance assessments. Valid and reliable assessment of learners' language abilities requires teachers' thorough consideration and expertise, and teachers often recognize their limitations.

From this perspective, among the various internal characteristics of teachers, epistemological beliefs are crucial as they influence what and how students learn. Previous studies in Korea often analyzed the differences in teachers' performance based on epistemological beliefs in the teaching and learning context, such as lesson planning (Jo et al., 2009; Park, 2018b). In this study, we hypothesized that there would be differences in pre-service teachers' planning and execution of assessments based on their epistemological beliefs.

III. Methods

The purpose of this study is to investigate the differences in the patterns of performance assessment task plans for KLE among pre-

service elementary teachers based on their epistemological beliefs. To achieve this, the research targeted 150 junior (third-year) students from two national universities of education in Korea. University A is located in the Gyeonggi province, and 86 students (57.3%) from that school participated in the research. University B is situated in the Jeonnam province, with 64 students (42.7%) participating in the study. Among the total sample, 70.7% were female (n=106), and 29.3% were male (n=44). To assess participants' epistemological beliefs and performance assessment plans in KLE, a two-part questionnaire was provided. Participants who agreed to the study received an explanation of the research during the <Korean Language Arts Education II> class and completed the questionnaire by hand. Participants independently responded to the questionnaire items for 30 minutes.

1. Epistemological beliefs

The first part of the questionnaire included a survey to assess the independent variable of epistemological beliefs. To achieve this, a questionnaire on epistemological beliefs based on Schommer's (1990) items was translated into Korean. The questionnaire consisted of 63 items related to five dimensions: Simple Knowledge, Certain Knowledge, Authority Source, Innate Ability, and Quick Learning. Participants responded to each item, reflecting their beliefs about understanding, knowledge, and facts, employing a 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree). The survey's validity was substantiated through prior quantitative studies involving pre-service teachers in Korea (Oh & Lee, 2013; Yoo, 2016). For this study, the translated items were reviewed by three KLE researchers and finalized after necessary modifications.

To validate the appropriate structure of the 63 items into five factors for the sample in this study, reliability tests were conducted. The initial Cronbach's α for all 63 items was .764, indicating appropriate reliability even though the sample size was highly restricted com-

pared to the number of survey items. Following the reliability coefficient, a total of 8 items were removed. Consequently, Cronbach's α value for the remaining 55 items was adjusted to .781.

Table 1. Cronbach's α for Epistemological Belief Domains and Subsets

Dimension	Subsets	# of Items	Reversed	Cronbach's α
1. Simple Knowledge	1) Seek Single Answer	11	4	.540
	2) Avoid Integration	7	3	
2. Certain Knowledge	1) Avoid Ambiguity	3	0	.441
	2) Knowledge is Certain	5	3	
3. Authority Source	1) Don't Criticize Authority	6	3	.140
	2) Depend on Authority	3	1	
4. Innate Ability	1) Can't Learn How to Learn	4	4	.494
	2) Success is Unrelated to Hard Work	3	2	
	3) Ability to Learn is Innate	4	0	
5. Quick Learning	1) Learning is Quick	5	2	.401
	2) Learn First Time	2	1	
	3) Concentrated Effort is a Waste of Time	2	1	
TOTAL		55	24	.781

Despite the item deletion, the range of reliability for domains remained between .140 and .540 indicating a relatively low level. However, accurately measuring epistemological beliefs can be challenging, and low reliability may be anticipated (Schommer, 1994). Therefore, the study proceeded with basic statistics and cluster analysis based on the data for the final 55 items after item removal.

2. Aspects of performance assessment plans in KLE

The second section of the questionnaire featured a combination

of multiple-choice and open-ended questions aimed at quantitatively examining the planning aspects of performance assessments in KLE by pre-service elementary teachers. Given that pre-service elementary teachers are expected to teach all subjects, understanding how their beliefs are specifically expressed in certain subjects, such as KLE, is crucial to understanding the relationships between the beliefs and the practices. Participants were instructed to design performance assessments freely for the 6th-grade achievement standard: "[6K02-04] Read various texts reflecting diverse perspectives related to the problem and utilize them for problem-solving." The standard was chosen based on the implication that participants could incorporate their understanding of knowledge and how to apply it in diverse contexts (Ministry of Education, 2022). As outlined by Cheon (2001), performance assessments should facilitate the direct observation of essential and authentic tasks aligned with the curriculum content. Therefore, an accurate understanding of the achievement standard and subsequent development of tasks based on this understanding are crucial components of assessment. In this study, the differences in participants' comprehension of the achievement standard and planning of performance assessment were systematically investigated using survey responses.

For the item-specific types in Table 2, both quantitative and qualitative analysis methods were employed. Firstly, for items where participants could choose multiple characteristics of the nature of the planned performance assessment, quantitative analyses such as frequency analysis and chi-square tests were conducted. These analyses aimed to examine whether the nature of the performance assessment pursued by pre-service teachers varied according to their epistemological belief types.

Table 2. Composition of Test Items for Examining Patterns in Performance Assessment Planning

Area		Example	Response Type
1. Understanding of Achievement Standards		"Describe your understanding of the given achievement standard."	Open Response
2. Nature of Performance Assessment	1) Behavioral Areas According to Educational Objective Classification	"Indicate the nature of the performance assessment you would like to conduct, considering Korean language teaching and learning context given."	Multiple choice
	2) Difficulty		
	3) Performance Assessment Method		
	4) Allocated Sessions (hours)		
3. Specific Evaluation Elements	1) Evaluation Tasks and Methods	"Freely describe the performance assessment plan you would like to implement, considering Korean language teaching and learning context given."	Open Response
	2) Specific Evaluation Elements		
	3) Evaluation Criteria		

Secondly, a qualitative analysis based on grounded theory (Strauss & Corbin, 1998) was conducted to understand the patterns of comprehension of achievement standards and the plans for performance assessment. Similar concepts were organized based on shared attributes and dimensions, and subsequent comparisons were made between each characteristic and participants' epistemological beliefs. Employing the inherent categorization technique of grounded theory allowed for the identification of the types of epistemological beliefs held by pre-service teachers, shedding light on the approach each teacher took toward assessment (Chenitz & Swanson, 1986).

Regarding the transcribed open-ended questions for performance assessment tasks, codes emerged during data review and re-review depending on the belief profiles. During this open coding phase, a categorical aggregation process was implemented to identify and

cluster related codes into broader themes or categories (i.e., presenting various perspectives, autonomy of choice, realistic problems and solutions, validity, problem understanding, self-appropriation, real-life application, problem-solving attitude, and observation in real-life contexts). Aligning with thematic analysis, researchers engaged in this process by re-reading the raw data to categorize the clusters. This axial coding involved a selective coding process, focused on refinding and organizing the categories. The resulting data were then consolidated and reduced to derive meaning by connecting interrelated elements (Creswell, 2013). Following the contextualization and representation of the analyzed data, Schommer's (1990) epistemological beliefs were adjusted to present the relationships within each group, serving as a framework to illustrate the patterns of these relationships.

IV. Dynamics in Planning Performance Assessment Tasks

1. Aspects of individual epistemological beliefs

In this study, the epistemological beliefs of pre-service elementary teachers in Korea were examined based on Schommer's (1990) survey items. Employing reliability tests and factor analysis, basic statistical analysis was conducted on the final selection of 55 items. The results, as presented in Table 3, indicate that the sub-factor with the highest average is 'Knowledge is Certain (m=3.46; sd=.53)', while the sub-factor with the lowest average is 'Can't Learn How to Learn (m=2.19; sd=.60)'. In other words, most participants believe that certain knowledge or facts exist. Thus, it was expected that the participants would be positive about the learning curriculum or contents in the discipline. On the other hand, there was an observed tendency to perceive learning ability or strategies as developmental.

Table 3. Basic Statistical Results by Subsets of Epistemological Belief

Dimension	Subsets	*m*	*sd*
1. Simple Knowledge	1) Seek Single Answer	2.85	0.41
	2) Avoid Integration	2.29	0.39
2. Certain Knowledge	1) Avoid Ambiguity	3.06	0.71
	2) Knowledge is Certain	3.46	0.53
3. Authority Source	1) Don't Criticize Authority	3.00	0.36
	2) Depend on Authority	2.59	0.51
4. Innate Ability	1) Can't Learn How to Learn	2.19	0.60
	2) Success is Unrelated to Hard Work	2.49	0.48
	3) Ability to Learn is Innate	3.01	0.60
5. Quick Learning	1) Learning is Quick	2.62	0.47
	2) Learn First Time	2.89	0.60
	3) Concentrated Effort is a Waste of Time	2.86	0.79

The main purpose of this study was to examine the differences in the understanding and performance assessment plans of pre-service teachers in KLE based on their epistemological beliefs. Epistemological belief types were identified by K-means cluster analysis. The mean of each subsets of epistemological beliefs dimensions in Table 3 was converted into a standardized score, and the scores were then utilized in cluster analysis. The dendrogram, calculated based on Euclidean distances, revealed a balanced distribution of cases across three clusters, indicating distinct types. The K-means cluster analysis further confirmed the presence of three clusters, as depicted in Figure 1 below.

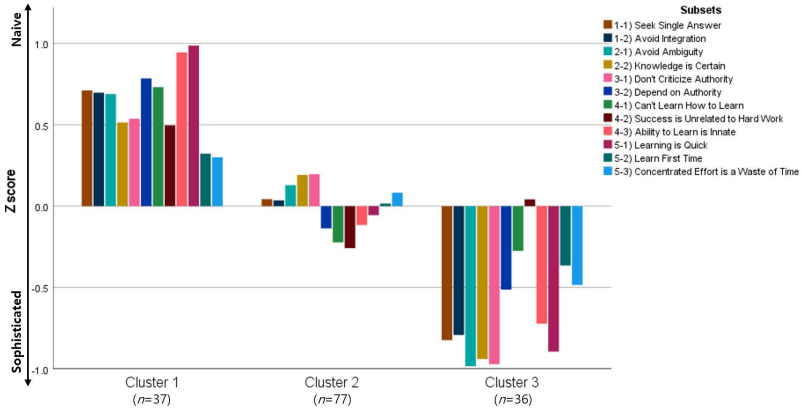

Figure 1. Types of Epistemological Beliefs Among Pre-service Elementary Teachers

As shown in Figure 1, Clusters 2 and 3 exhibit contrasting patterns across all subsets of epistemological beliefs. Among the three groups, Cluster 2 emerged with the highest proportion at 51.3% (*n*=77). Subsequently, Cluster 1 followed with 24.7% (*n*=37), and Cluster 3 with 24.0% (*n*=36) which is a very similar ratio.

The observed results are similar to patterns identified in Schommer's (1990, 1994) questionnaires used in this study. According to Schommer (1990), learners' epistemological beliefs can be broadly categorized into two types: Naive and Sophisticated. Learners with naive beliefs perceive knowledge as singular, discovered and transmitted by authorities, and they believe that learning ability is innate. Learners with sophisticated beliefs, on the other hand, consider knowledge to be constructed through individual learning and subject to change due to its uncertainty. These two groups of learners correspond to Clusters 1 and 3 in this study.

Apart from these, there was another cluster, Cluster 2, showing inconsistent responses and contrasting scores within sub-factors. A similar group to Cluster 2 has been identified in previous studies on epistemological beliefs and labeled as a 'Mixed' group. Jo et al. (2009), examining the epistemological beliefs of domestic elemen-

tary and middle school teachers, and Park (2018b), who investigated changes in epistemological beliefs before and after teaching practicum among pre-service elementary teachers, both identified a group of pre-service teachers with mixed belief types.

Cluster 2 in this study exhibits a distinctive characteristic in that the tendencies within each of the five epistemological belief dimensions are contrasting. While acknowledging variables such as Simple Knowledge and Certain Knowledge, participants rejected the notion of Innate Ability. This implies that Cluster 2, the Mixed group, understands that knowledge to learn can develop progressively, yet they firmly believe in the clear existence of the knowledge they need to learn. The ambivalent responses towards Authority Source and Quick Learning highlight the distinct characteristics of Cluster 2. Firstly, they acknowledge that knowledge is established by authorities but do not excessively rely on those authorities, rather embracing new perspectives. Secondly, they demonstrate a nuanced stance on learning, assuming that if one possesses sufficient ability, rapid acquisition of specific content is possible; however, they perceive that this does not manifest effectively in actual learning situations.

The inconsistent response pattern of Cluster 2 may be attributed to the previously mentioned issues with low item reliability in particular dimensions such as Authority Source, as discussed in Chapter III. Firstly, the nature of the survey tool using a self-reported Likert scale may have led to low response fidelity or internal inconsistency. Secondly, each area of the epistemological beliefs involves both knowledge and understanding and an individual's experiences and behavioral characteristics based on those beliefs. Therefore, a gap between an individual's epistemological belief orientation and the manifestation of their responses can occur. Considering that all participants in this study shared the identity of pre-service elementary teachers, it is plausible that they consciously aligned their responses with societal expectations of the belief expected of a teacher. This alignment could contribute to the inconsistency observed within Cluster 2, given the

participants' high sincerity in responding to the performance assessment activities presented in the latter part of the survey.

Table 4. Basic Statistical Results by Epistemological Belief Types

Dimension		1. Simple Knowledge		2. Certain Knowledge		3. Authority Source		4. Innate Ability			5. Quick Learning		
Subset*		SSA	AI	AA	KC	DCA	DA	CHL	SUH	ALI	LQ	LF	CEW
ANOVA	*F*	30.17	27.67	41.47	31.29	34.61	21.54	15.80	7.82	40.49	57.08	4.54	6.63
	p	=.00	=.00	=.00	=.00	=.00	=.00	=.00	<.01	=.00	=.00	<.05	<.01
[Cluster 1] Naive (*n*=37)	*m*	3.14	2.56	3.55	3.74	3.19	2.99	2.62	2.73	3.58	3.09	3.08	3.09
	sd	0.33	0.33	0.59	0.47	0.30	0.37	0.60	0.37	0.55	0.44	0.49	0.77
[Cluster 2] Mixed (*n*=77)	*m*	2.86	2.31	3.15	3.56	3.07	2.52	2.05	2.36	2.94	2.59	2.90	2.92
	sd	0.34	0.34	0.58	0.46	0.27	0.42	0.50	0.50	0.48	0.32	0.57	0.73
[Cluster 3] Sophisticated (*n*=36)	*m*	2.51	1.99	2.36	2.96	2.64	2.33	2.02	2.51	2.58	2.19	2.67	2.47
	sd	0.36	0.32	0.54	0.40	0.37	0.56	0.58	0.47	0.43	0.35	0.71	0.83

* SSA=Seek single answer; AI=Avoid Integration; AA=Avoid Ambiguity; KC=Knowledge is certain; DCA=Don't criticize authority; DA=Depend on authority; CHL=Can't learn how to learn; SUH=Success is unrelated to hard work; ALI=Ability to learn is innate; LQ=Learning is quick; LF=Learn first time; CEW=Concentrated effort is a waste of time

The basic statistical results by sub-area according to epistemological belief types are presented in Table 4 above. The ANOVA revealed significant mean differences among types. However, the chi-square test indicated no significant differences in epistemological belief types based on demographic characteristics such as gender (p=.278), school affiliation (p=.814), and specific major (p=.588). This implies that epistemological beliefs are constructed based on individuals' experiences and attitudes toward knowledge and learning, rather than being influenced by the groups they belong to.

2. Epistemological beliefs in action

In this study, both quantitative and qualitative analyses were conducted to examine the patterns in performance assessment planning among pre-service elementary teachers. Specifically, to facilitate quantitative analysis, multiple-choice items, as presented in Table 2, were included in the task planning questionnaire. This approach aimed to allow pre-service teachers to independently select their intended plans for specific achievement standards, enabling a comprehensive analysis of open-ended responses. Participants indicated the stages they aimed for in the behavioral domain based on the classification of educational objectives, along with an assessment of the anticipated difficulty. Furthermore, they provided details about the specific methods of performance assessment and the allocated lesson sessions they planned to conduct The following results present an analysis of participants' responses to each item.

Table 5. Educational Objectives Classification of Performance Assessments Expected by Pre-Service Teachers

Taxonomy	Knowledge	Understanding	Application	Analysis	Synthesis	Evaluation	Total
Response N	26	78	127	80	58	79	448
In Response(%)	5.8	17.4	28.3	17.9	12.9	17.6	100
In Case(%)	17.3	52	84.7	53.3	38.7	52.7	298.7

Firstly, the aim was to examine the patterns of educational objective classification in performance assessments, constructed based on the achievement standard, "[6K02-04] Read various texts reflecting diverse perspectives related to the problem and utilize them for problem-solving." Table 5 above illustrates a frequency analysis of multiple responses, providing insights into the 448 responses from 150 participants. Participants reported an average of 2.99 areas (*sd*=1.24) corresponding to the educational objectives of their planned performance

assessments. Among the seven categories of educational objectives, the 'Application (28.3%)' area was most frequently mentioned as the goal of performance assessments. This outcome aligns with the emphasis on reading various perspectives and utilizing them to solve problems, as stated in the achievement standard itself. Notably, the ratio of participants selecting the Knowledge area was 5.8%, contrasting with these results. Also, the selection rates for the Understanding, Analysis, and Evaluation areas were at similar levels.

Table 6. Cross-Analysis Results of Educational Objectives Classification by Selected Domain Number

Selected domain		Cluster 1 (Naive)	Cluster 2 (Mixed)	Cluster 3 (Sophisticated)	Total
Total *N*		37	77	36	150
Knowledge	*n*	11	9	6	26
	In cluster (%)	29.7	11.7	16.7	
Understanding	*n*	23	36	19	78
	In cluster (%)	62.2	46.8	52.8	
Application	*n*	31	63	33	127
	In cluster (%)	83.8	81.8	91.7	
Analysis	*n*	21	39	20	80
	In cluster (%)	56.8	50.6	55.6	
Synthesis	*n*	19	26	13	58
	In cluster (%)	51.4	33.8	36.1	
Evaluation	*n*	20	36	23	79
	In cluster (%)	54.1	46.8	63.9	

According to the ANOVA test results, there was a significant difference in the pattern of educational objective classification based on the three types of epistemological beliefs (p=.016). Clusters 1 (m=3.38; sd=1.36) and 3 (m=3.17; sd=1.25) selected more objectives than Clus-

ter 2 (m=2.71; sd=1.11). Although the chi-square test revealed no significant differences, the patterns of performance assessment goal-setting in each cluster became more apparent through the cross-analysis based on the epistemological belief types presented in Table 6.

All three groups predominantly selected objectives related to Understanding, Application, and Analysis for the specified achievement criterion. However, Cluster 1 (29.7%) had a relatively higher proportion of Knowledge objectives compared to Cluster 2 (11.79%) and Cluster 3 (16.7%). Additionally, Cluster 3 (63.9%) had a relatively higher proportion of Evaluation objectives compared to Cluster 1 (54.1%) and Cluster 2 (46.8%). Summarizing these results, the Naive (Cluster 1) group's pre-service teachers exhibited a pattern of setting multiple educational goals comprehensively for the performance assessment task, including the Knowledge domain. On the other hand, pre-service teachers in the Sophisticated (Cluster 3) group reflect higher-level educational goals, such as Application, Analysis, and Evaluation, in their tasks. The Mixed (Cluster 2) group, while having a smaller number of selected areas, prioritized the attainment of goals related to application.

Secondly, the response results regarding the anticipated difficulty of performance assessments show that participants primarily expected a moderate level of difficulty for the performance assessments they planned. Among the 150 participants, 91 pre-service teachers (60.7%) anticipated a moderate difficulty level, while 39.3% (n=59) expected a high difficulty level. No participants expected a low difficulty level for performance assessments. The chi-square test results showed no significant difference in the pattern of difficulty level settings for performance assessments based on epistemological belief types (p=.696).

Table 7. Patterns of Task Types in Performance Assessments Planned by Pre-Service Teachers

Type	Response N	In Response (%)	In Case (%)
Realistic problem solving	84	24.6	56.0
Practical experiences	11	3.2	7.3
Observation	41	12.0	27.3
Oral exam	8	2.3	5.3
Discussion	84	24.6	56.0
Portfolio	22	6.4	14.7
Learning report	22	6.4	14.7
Response essay assessment	67	19.6	44.7
Multiple choice	1	0.3	0.7
Other	2	0.6	1.3
Total	342	100	228

Thirdly, the response patterns of participants regarding the types of tasks in performance assessments were examined. Results from the multiple-choice questionnaires, where 150 participants specified the types of tasks in their designed performance assessments, revealed a total of 342 response frequencies. The multi-response frequency analysis table is presented in Table 7. All participants selected 'Realistic Problem Solving (24.6%)' and 'Discussion (24.6%)' task types most frequently. Following closely was a high proportion of selections for the 'Response essay (19.6%)' assessment task. In contrast, the least-selected task type was the 'Multiple-Choice (0.3%)' assessment.

This tendency extends the pattern observed in Table 5, where the proportion of participants selecting the Knowledge domain as an evaluation goal was the lowest. This emanates from the inherent nature of performance assessments, aiming to directly and practically evaluate the performance of learning tasks (Cheon, 2001). The chi-square test results indicated a significant difference in the two selecting performance assessment task types based on epistemological

belief types: Response essay assessment (p<.05) and Other (p<.05). Among these, only two participants from the Cluster 1 (Naive) group selected the Other category, opting for discussion and video production activities. In contrast, the results reveal cluster-based differences in the use of the response essay assessment in spite of being chosen by a majority of the total sample (44.7%). Among the three clusters, the Sophisticated group selected the Response essay assessment type at the highest rate (58.3%). While the Naive group also adopted this type of task with a majority (51.4%), the Mixed group showed a lower selection rate, with only 35.1% opting for it.

Lastly, the number of lesson hours allocated for the designed performance assessments was investigated. Participants responded that they would allocate an average of 2.9 sessions (sd=2.1) to assess the specified achievement criteria. The ANOVA revealed no significant difference in the allocation of sessions for performance assessments based on epistemological belief types (F=1.425; p=.244). However, among the three types, Cluster 1 (Naive) had the highest average sessions allocated (m=3.30; sd=2.82), followed by Cluster 3 (Sophisticated) with a higher average (m=2.93; sd=2.00). Finally, Cluster 2 (Mixed) had the lowest average sessions allocated (m=2.60; sd=1.71).

In summary, the quantitative analysis of various sub-factors that can reveal the nature of performance assessment plans shows a limited significant difference based on epistemological belief types. An overall trend, pre-service teachers in Korea designed performance assessment tasks for 6th-grade students incorporating realistic problem-solving and response essay-type tasks. They planned the task with an average number of 2.9 session hours intending to observe students' performance using multiple sessions. This constructed performance assessment was expected to be of moderate to high difficulty for 6th-grade students, focusing on achieving a composite Understanding, Application, and Analysis of educational goals. The Naive group demonstrated the most diverse selection of instructional goals for performance assessment, often including lower-level educational objectives encompassing Knowledge and Understanding domains. In contrast,

the Sophisticated group exhibited a higher proportion of goals demanding a higher dimension such as the Evaluation domain, actively utilizing the Response essay assignment type. Differences were found in the number, patterns, and types of instructional goals selected for performance assessment, as well as in the types of assessment tasks, based on epistemological belief groups.

3. Planning patterns for epistemological beliefs

The study investigated the open-ended responses of pre-service teachers concerning performance assessment tasks. The qualitative analysis revealed distinct patterns in the assessment plans, deviating from the previous survey results. Figure 2 displays excerpted sample responses from each group.

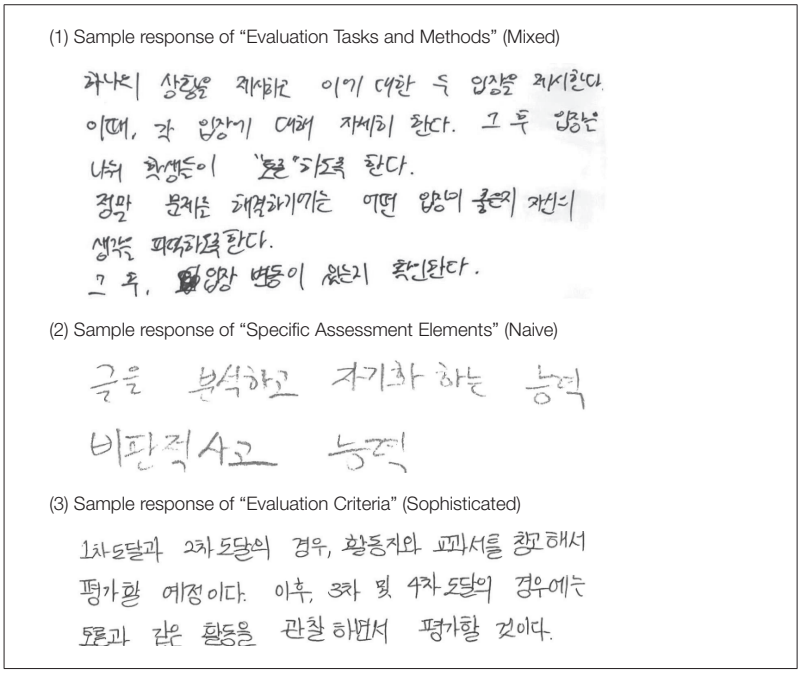

Figure 2. Sample responses from the Naive Group, Mixed Group, and Sophisticated Group corresponding to each category

The themes revealed by each group were classified by similar characteristics based on categories and described according to Schommer's dimensions. Table 8 illustrates pre-service teachers' task plan patterns based on their responses in alignment with categories. Additionally, to enhance the connection between sub-categories, themes among each group, and their relevance to dimensions, a 'contents' column was added.

Common elements across all groups include the autonomy to choose perspectives, allowing participants to express diverse viewpoints, and exercising flexibility in their selections in the category of Evaluation Tasks and Methods. These elements potentially align with the explicitly indicated achievement standards of 'presenting various perspectives.' A focus on the ability to read and comprehend different perspectives emerged as a trend among the participants, reflecting a common understanding of knowledge acquisition through varied viewpoints. For example, all three groups equally emphasized 'viewpoints/perspective analysis' and 'understanding perspectives' by indicating the need to "analyze perspectives in the given texts" or to "understand viewpoints based on the presented situation."

In the Mixed group, tasks and methods revolved around individual perspective analysis and self-reflection, forming a common pattern observed across all three groups. Notably, explicit presentations of real-life situations were absent, and the proposal of multiple sessions was not prominently featured. In the Evaluation Tasks and Methods category, the group tended to provide related readings, exposing participants to various perspectives, rather than presenting specific real-life examples. Unlike the other two groups that provided specific situations in real life, the Mixed group responses reflect a context where perspectives are found within unspecified situations, such as "presenting problem situations." In terms of Specific Assessment Elements, the group consistently emphasized the use of 'self-criteria' for problem-solving, maintaining balance within Schommer's (1990) dimensions. Evaluation Criteria appeared less explicit in terms of the

number of proposed sessions compared to the other groups, which aligns with the findings from the quantitative analysis. With a limited number of proposed sessions and educational objectives, the group showed a detailed focus on the establishment of personal criteria, problem-solving judgment criteria, and a distinct resolution-oriented approach.

The Naive group demonstrated a comprehensive approach through tasks involving a realistic understanding of knowledge. Their activities included the integration of mind maps, assessments spanning multiple sessions, idea boards, role-playing, discussions, and writing to articulate personal viewpoints. In their approach to Evaluation Tasks and Methods, the group demonstrated profound comprehension of the diversity of knowledge, specifically perspectives.

This approach reveals a strategy that goes beyond simplistic knowledge acquisition, emphasizing the belief that diverse knowledge can be acquired in real-life situations. In terms of Specific Assessment Elements, the Naive group exhibited a pattern akin to the Mixed group, particularly in showcasing 'Certain Knowledge'. However, the distinction lies in the expression of personal viewpoints. While both Mixed and Naive groups emphasize concrete personal perspectives, the Naive group stands out in their approach. In understanding knowledge, the presence of expressions like "critical reading" and "accepting critically" in the context of 'Certain Knowledge' reveals a recurrent theme of 'critique'.

This pattern conflicts with Schommer's (1990) description of the Naive, as the group reflects knowledge not as an absolute transmission but rather as acquired through critical interpretation. It serves as a noteworthy example of pre-service teachers adjusting their epistemological beliefs despite being in their developmental stage. This intention can be interpreted as prioritizing the original purpose of the KLE achievement standards, emphasizing an assessment of the reading process that underscores learners' critical interpretation and perspective formation in educational execution. This aspect is evident

Table 8. Epistemological Beliefs in Patterns of Performance Assessment

Performance Assessment Tasks			Epistemological Belief			Schommer's Epistemology belief dimension
Category	Sub-category	Contents	Naive	Mixed	Sophisticated	
Evaluation Tasks and Methods	Presenting various perspectives	Knowledge acquired through inference and logic.	Understanding perspectives, presenting diverse methods, structuring assessments over N sessions	Perspective Analysis	Understanding perspectives, structuring assessments over N sessions	Simple Knowledge
	Autonomy of choice	Knowledge is not fixed.	Organizing my perspectives	Appropriation	Finding viewpoints similar to mine	Certain Knowledge
	Realistic problems and solutions	Knowledge is acquired through life experiences.	Presenting real-life situations	Researching relevant materials, writing personal perspectives	Presenting real-life situations	Innate Ability
Specific Assessment Elements	Validity	Acquiring knowledge based on valid reasoning.	Emphasizing evidence over claims and the process over resolution	Organizing personal opinions through diverse perspectives	Reading with diverse perspectives	Simple Knowledge
	Problem understanding	Knowledge is interrelated concepts.	Critical reading	Problem-solving judgment criteria	Reading and understanding from different perspectives	Authority Source
	Self-appropriation	Knowledge requires individual understanding as it is not fragmented.	Expressing one's viewpoints	Establishing personal criteria	Grasping key content and identifying differences	Certain Knowledge
	Real-life application	The ability to apply acquired knowledge in real life.	The ability to apply knowledge in real-life scenarios	Ability to solve problems	Explaining personal choices on perspective	Innate Ability
Evaluation Criteria	Problem-solving attitude	The versatility to utilize knowledge in various situations.	Critical thinking, an attitude accepting diverse perspectives, even those different from one's own	Content of the respective perspective, observation participation assessment, worksheet	Observation assessment, participation assessment, narrative assessment, evaluation following worksheet and textbook	Authority Source
	Observation in real-life contexts	The capacity to transform and apply acquired knowledge in real life.	Effectively applying and connecting diverse viewpoints in problem-solving	Adequately perceiving situations and articulating the perspective clearly	Acquiring knowledge without bias	Innate Ability

in the Evaluation Criteria, where the assessment includes checking whether the problems were comprehended and resolved critically. Furthermore, this response underscores the practical application of knowledge in real-life scenarios, emphasizing the prioritization of the problem-solving process over mere resolution.

The Sophisticated group exhibited a pattern similar to that of the Naive group in understanding perspectives, structuring assessments over multiple sessions, and presenting real-life situations. This finding focused on real-life applications aligns with the quantitative analysis result that the Sophisticated group had a high tendency to choose the Application domain in their task planning. However, in organizing their viewpoints, the Sophisticated group employed expressions such as "find/choose perspectives similar to their own," contrasting with the expressions used by the Naive and Mixed groups, which emphasized "establishing" and "making perspectives their own."

This finding suggests a tendency in the Sophisticated group to select viewpoints from the given knowledge, interpreting it as a pattern of accepting knowledge as is, without transforming it, akin to certain knowledge. In Specific Assessment Elements, expressions like "explaining their choices" indicated an assessment pattern of choosing knowledge from the given set without modifying it. Another notable difference lies in the emphasis on using narrative assessments and guide materials for Evaluation Criteria. Given the nature of the Sophisticated group, which perceives knowledge as uncertain, the use of worksheets and textbooks, which require lengthy writing of information, aligns with the authority source dimension, providing a means to ascertain the diverse perspectives of students.

It is essential to acknowledge that epistemological beliefs are not static; rather, they evolve through the interplay of personal development and the surrounding contextual environment (Bromme et al., 2010). Each dimension operates independently in terms of characteristics and functions, and the developmental pace may vary across dimensions. Building on Jo et al.'s (2009) insight that comprehending

an individual's epistemological beliefs necessitates considering all dimensions collectively, it becomes apparent that a comprehensive approach is vital for a nuanced understanding.

V. Discussion and Conclusion

The analysis of pre-service teachers' responses to performance assessment tasks revealed patterns among the Naive (n=37), Mixed (n=77), and Sophisticated groups (n=36). Despite the initial expectations, quantitative data on the nature of performance assessment task planning show limited significant differences based on epistemological belief types. To assess the 6th-grade KLE achievement standard related to reading various perspectives on a given topic and utilizing them for problem-solving, the Sophisticated group established high-level behavioral objectives, akin to those in the assessment domain. To accomplish this, they opted for Response essay-type assignments. According to Scardamalia & Bereiter (1987), writing enables individuals to integrate information, restructure knowledge, and bring about conceptual changes. Therefore, the active utilization of Response essay-type assignments by the Sophisticated group can be considered a well-aligned outcome, given the context of the performance assessment, educational behavioral objectives, and task settings. In contrast, the Naive cluster selected a combination of diverse behavioral objective levels, but the results indicated a tendency to include lower-level behavioral objectives, such as Knowledge and Understanding, more frequently than other clusters.

The findings are somewhat consistent but distinct from Schommer's (1990) definitions of epistemological belief dimensions, specifically in the Authority Source and Simple Knowledge dimensions, reflecting the unique context of pre-service teachers' "epistemic cognition" regulation (Sandoval et al., 2016). This can be interpreted as

evidence of pre-service teachers making efforts to plan assessments that align with the objectives and intentions of Korean language achievement standards, attempting to regulate their own epistemological beliefs. Sandoval et al. (2016) have defined epistemic cognition as the individual's endeavor to contemplate their understanding, the nature of knowledge, its practical application, and the methods by which they ascertain the validity of their knowledge in interdisciplinary fields. For example, instances from the Naive group that emphasize critical interpretation align with the notion that knowledge is acquired through nuanced understanding rather than passive acceptance, contrasting with Schommer's (1990) definition. A comparison among the groups reveals differences in when they show their beliefs in practical ways (i.e., performance assessment task) that these nuances in their engagement with and interpretation of knowledge demonstrate certain aspects of pre-service teachers' epistemic cognition. Due to the limited research on teachers' epistemological beliefs in the domestic context, there is also a scarcity of studies examining epistemic cognition. Therefore, if subsequent research focuses more on the design of studies exploring epistemic cognition as a meta-belief regulatory behavior, it could contribute to supporting the validity of the results obtained in this study.

While all groups highlighted perspective analysis and understanding, the Mixed group's distinct expressions and the absence of real-life scenarios indicate variations in their epistemological orientations. Although the study concentrated on KLE, the findings hold potential for broader application in other subjects or interdisciplinary contexts. Understanding these patterns is crucial for pre-service teacher education, urging educators to recognize diverse epistemological perspectives among students and tailor instruction to foster critical engagement with knowledge, bridging the gap between theoretical understanding and real-world application.

However, the study acknowledges a limitation arising from the use of the original epistemological beliefs survey (Schommer, 1990).

The results might differ with a revised survey capturing developments in epistemological beliefs over time. Specifically, confirmatory factor analysis was not conducted to determine whether the survey instrument was well-structured and applicable to Korean pre-service teachers according to Schommer's (1990) five factors. Due to the limited sample size, there is also a possibility that it does not sufficiently represent the entire population of pre-service elementary teachers in Korea. Also, this study lacked items to assess the pre-service teachers' background knowledge that might influence on their assessment task planning. Despite these limitations, the study holds profound implications for understanding the dynamic relationship between pre-service teachers' epistemological beliefs in a natural context and their task design in KLE, despite potential influences from coursework and the potential applications of the relationships across diverse subjects and disciplines. Furthermore, in order to ascertain whether the patterns of assessment planning based on epistemological beliefs are unique within the context of Korean language assessment, subsequent research comparing other subject contexts should be conducted. Particularly, this study highlights the difference in competencies required, as it encompasses all subjects for pre-service elementary teachers, while pre-service secondary Korean language teachers focus specifically on KLE. Therefore, there is a need for follow-up research to investigate the impact of epistemological beliefs among pre-service secondary teachers.

This suggests that the study provides valuable insights that can inform future research and educational practices under the need for tailored instructional strategies capable of accommodating diverse epistemological belief orientations and fostering critical engagement with interdisciplinary knowledge. As the field progresses, further research should delve deeper into the dynamics of epistemological beliefs, offering a more comprehensive understanding of their development and implications for effective teacher education. By discerning the intricate connections between epistemology and assessment, educators

can refine teaching practices and better equip future teachers for the multifaceted challenges of the classroom. It marks a significant step toward unraveling the complex interplay between epistemology and assessment in the context of pre-service teacher education.

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ABSTRACT

Unveiling Pre-Service Teachers' Epistemological Beliefs in the Planning of Korean Language Assessment

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This study explores the epistemological beliefs of pre-service elementary teachers in Korean language education and their impact on performance assessment task planning. Grounded in the correlation between teachers' beliefs and instructional approaches, the research aims to redefine Schommer's (1990) epistemological dimensions in tasks designed by pre-service teachers. Data from 150 participants were analyzed quantitatively and qualitatively, revealing three belief-based clusters: Naive (24.7%), Mixed (51.3%), and Sophisticated (24.0%). Task planning patterns in all groups focus on individual perspective analysis and self-reflection. The Mixed group emphasizes related readings, exposing participants to various perspectives. In contrast, the Naive group employs diverse tasks in multiple sessions, emphasizing critical interpretation and real-life situations. The Sophisticated group chooses perspectives from given texts, relying on textbooks or worksheets. Understanding how these beliefs are shaped or regulated during the assessment task planning informs the intersection of educational philosophy and practical application, laying the groundwork for well-informed educational practices and a nuanced understanding of epistemological beliefs.

KEYWORDS Epistemological belief, Performance assessment, Korean language education, Pre-service elementary teacher, Teacher education, Cluster analysis, Grounded theory