

Data collection procedure

PILOT TEST

The Pre-Piloting Phases

During this phase, we engaged in the collection and preparation of questionnaires that were deemed relevant to the study. The items were gathered through an extensive review of literature, academic articles, and dissertations. After the initial collection, a thorough screening process was implemented to identify the items that were most applicable to this research. Furthermore, while visiting schools, I identified and included additional relevant items. These visits involved informal interviews with school principals, administrative staff, teachers, and students, which helped uncover pertinent questions that were incorporated into the questionnaires to better reflect the context of the newly established government boarding schools. The pre-piloting phase is divided into two parts: the exclusion of irrelevant items and the adaptation of relevant materials sourced from literature and online platforms. Notably, (Iskandar et al., 2022) (Hack-Polay & Mahmoud, 2021) contributed a variety of items related to boarding school challenges.

1. Item Pooling

a) Review of literature and existing relevant tools as sources

we took the items of psychological challenges from three different sources; web pages and borrowed from the existing tools. I collected 18 items from Kanine (2019), and 14 from review of literature by Colmont et al., (2005) and 16 items from existing tools referenced in (panoba, 2022). In addition to this, while I was on school visit, I made informal interview and developed 7 items according to the government SSBS context.

b) Initial visits and consultative meetings with officials

The main objective of this study is to develop the relevant psychometric instrument. In the course of my initial visits and consultative meetings with the school administration, staff, and students residing in the boarding facility, I engaged in informal observations and interviews.

The existing instrument cannot accurately measure the psychological challenges according to the Ethiopian special secondary boarding school context. Therefore, it is essential that its tools have sound psychometric properties to ensure the reliability of the instrument designed for the psychological well-being and support services of the boarding schools. Therefore, the relevant

instrument on psychometric measurement tools should be relevant if it is reliable, and valid, and its factor structure is properly defined.

c) Initial pool

Tool 1 Measure of Psychological Challenges of students in Boarding School (MPC)

Subscales/ themes	Item name	Number of initial items for Expert Judgment
Home- sickness	PsyCh1	Missing my family creates obstacles in my ability to concentrate on my studies.
	PsyCh2	I regret not having stayed with my family and maintaining contact with them.
	PsyCh3	I find myself concerned about my family when I am lying in bed.
	PsyCh4	I hold my parents responsible for the challenges I am facing.
	PsyCh5	I struggle to sleep in the absence of my parents.
	PsyCh6	I have a strong desire to visit my family every weekend.
	PsyCh7	I sometimes feel sad and depressed without a clear reason.
	PsyCh8	I regularly experience feelings of loneliness.
	PsyCh9	I feel unable to express my emotions in boarding school.
Emotional stress	PsyCh10	I am occasionally unable to control my worries.
	PsyCh11	I frequently feel isolated from my friends.
	PsyCh12	I am not feeling happy to be here in this boarding school.

Keys: PsyCh?

Tool 2 Measure for Support Services provided to Students in Boarding schools (MSP)

Subscales/ themes	Item Name	Number of initial items for Expert Judgment
School Professional	SUPSR1	I have the opportunity to access guidance and counseling services in this school.

Guidance and counseling	SUPSR2	I and my friends get the access to healthcare facilities and medical professionals to address our health needs.
	SUPSR3	I am offered academic counseling to be successful and excel in my studies.
	SUPSR4	It is difficult to get help from the school counseling and guidance office.
	SUPSR5	I have had the opportunity to participate in sports, arts, and other extracurricular activities.
	SUPSR6	I am good at football playing with my friends.
Extracurricular Activities	SUPSR7	I am offered the provision of tutoring and study groups in the class.
	SUPSR8	Teachers give me support when I feel homesickness in school.
	SUPSR9	Having a discussion about any problem with friends is very easy.
	SUPSR10	My teachers are happy to see me paint
Teacher Peer support	SUPSR11	I regret not having stayed with my family and maintaining contact with them.
	SUPSR12	I find myself concerned about my family when I am lying in bed.
	SUPSR13	I struggle to sleep in the absence of my parents.
	SUPSR14	I have a strong desire to visit my family every weekend.

2 Preliminary Screening by the Researcher and Experts

The face validity of psychological challenges and support services (PCSS) was evaluated based on the judgments of ten educational psychologists; the PhD candidates and the instructors. For them to do the rating, they were provided with the following definitions of the two constructs:

Psychological challenges in boarding school mean the mental and emotional struggles that students might encounter due to being away from their families and familiar surroundings. These issues can impact their overall well-being, academic success, and social interactions (Ryff & Singer, 1996)

Support services in the boarding school mean the range of resources and programs designed to promote the well-being and academic achievement of the students in all aspects of their lives (Van Hoof & Hansen, 1999)

On psychological challenges 15 items were relevant and 9 of the evaluators forwarded their opinion on the need for improvement or irrelevant on the 6 items. The tool is revised and improved based on their profession point of view. This was conducted as a preliminary validation to make the tool ready for further **re-inspection**. Eight educational experts comprised of individuals who have ample experience in working with students in the higher education were used to further evaluate the content validity of the PCSS. The Content Validity Ratio ($CVR = \frac{n_e - N/2}{N/2}$, in which n_e is the number of raters indicating “relevant” and N is the number of raters) was computed, and (Soleimani et al., 2019) guidelines were used to select relevant items. All the experts expressed their concern on the relevance of the 15 items, and 6 experts were agreed on the relevance of the 2 items. Moreover, only 6 items were rated as relevant by 8 experts which later on modified by expressing it differently. Extensive review and judgments were conducted on the items based on the experts’ judgment to ensure PCSS items valid and relevant to the constructs aims to measure.

Table 3: The relevant items selected by the experts.

Psychological Challenges	
Please rate how true each statement is for you.	
Use the scale below to make your choice.”	
1.	I would be happy if I attended at the previous school near my parents’ home.
2.	I take it great satisfaction being I am part of this school community.
3.	I sometimes feel loneliness and I could not study hard.
4.	My parents did not visit me for the last 10 months.
5.	I sometimes cry for unknown reasons.
6.	I would love to be able to visit my family every weekend.
Support Services	
5 = strongly agree 4= agree 3 = Neutral 2 = disagree 1 = strongly disagree	
1.	I can access guidance and counseling services at my school.
2.	I have opportunities for tutoring and study groups in my classes.
3.	Academic counseling is available to help me succeed in my studies.
4.	I can participate in sports, arts, and various extracurricular activities.

5.	My friends and I have access to healthcare facilities and medical professionals for our health needs
6.	My teachers at my school provide me with applicable counseling and guidance both within the school and beyond.
7.	During the moments of homesickness, I find that my teachers and friends are always willing to help me.
8.	Getting help from the school counseling and guidance office can be challenging.
9.	Sharing my school challenge with my classmates is easy.

The item screening has two main phases: the researcher screening out relevant items. 10 items during item pooling seem trivial. Therefore, I dropped them out. During this phase, I added some relevant items. Secondly, the experts screened out the relevant items according to the current of the boarding school context. They were checked by applied experts' judgment to check if the items fairly and reliably to cover the variables that they propose to cover the psychological challenges and support services. It helps to check the relevance of the items. In addition, one of the Haramaya staff experts in statistics who is conducting his PhD in statistics analysed the validity of the items which was related to the psychological challenges and the support services. The following tables indicate the experts' judgment on items of psychological and support services.

Table 4: The experts' Judgment on **Psychological challenges**

S-CVI= 0.70 (Ave)

(Sum of proportion relevance rating) (Number of experts)

Item												
Description	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5	Rater 6	Rater 7	Rater 8	Rater 8	Number of Agreemen	I-CVI	Interpretation
PsyCh1	3	2	3	3	3	2	3	3	3		0.75	Average CV
PsyCh2	3	3	3	3	3	3	3	3	3		1	Average CV
PsyCh3	3	3	2	3	3	3	3	3	3		0.75	Average CV
PsyCh4	3	3	3	3	3	3	3	3	3		1	Average CV
PsyCh5	3	3	3	3	3	3	3	3	3		1	Average CV
PsyCh6	2	3	3	3	3	3	3	3	3		0.75	Average CV
										8-		
										Total		
										S-CVI/AV		

First, the researcher screened ten relevant items for the questionnaire. Then according to the above table, the expert judgment ultimately validated six items on the psychological challenges. The expert judgment process was crucial in improving the questionnaire. Careful reviewing and providing feedback, the experts identified only six specific items that were especially relevant and successfully indicated the psychological challenges under their investigation.

Table 5: The experts' Judgment on **support services**

S-CVI/= 0.70 (Ave)

(Sum of proportion relevance rating) (Number of experts)

Item											Number of Agreemen	I-CVI	Interpretation
Description	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5	Rater 6	Rater 7	Rater 8	Rater 8				
SUPSR 1	3	2	3	3	3	2	3	3	3		0.75	Average CV	
SUPSR 2	3	3	3	3	3	3	3	3	3		1	Average CV	
SUPSR 3	3	3	2	3	3	3	3	3	3		0.75	Average CV	
SUPSR 4	3	3	3	3	3	3	3	3	3		1	Average CV	
SUPSR 5	3	3	3	3	3	3	3	3	3		1	Average CV	
SUPSR 6	2	3	3	3	3	3	3	3	3		0.75	Average CV	
SUPSR 7	3	2	3	3	3	2	3	3	3		0.75	Average CV	
SUPSR 8	3	3	3	3	3	3	3	3	3		1	Average CV	
SUPSR 9	3	3	2	3	3	3	3	3	3		0.75	Average CV	
8-													
Total													
S-CVI/AV													

Subsequently, as the above table indicated the researcher screened twelve relevant items for the support services variable questionnaire. Then, based on the above table, the expert judgment ultimately validated nine items for the support services. The expert judgment process was crucial in improving the questionnaire. Careful reviewing and providing feedback, the experts ultimately approved six specific items that were especially relevant to the support services under their investigation.

3) Translation

The translation of the items has two phases; forward and backward translation. The translation was made by experienced and professional language experts. This includes translating the items from the English version to Afan Oromo, the English version to Amharic which is called forward translation. The second phase is translating from the local language to the English version. This is because of making sure that the translated items are directly related to the original items. The relevant items which were prepared by the author and the expert ready to translated to Afan Oromo and Amharic language.

The Piloting Phases

The piloting process of the piloting consists of three sequential phases: the initial pre-piloting phase, during piloting phase, and the post-piloting phase. Purpose of the piloting: the purpose of this piloting is to develop psychometric measurement tools for psychological challenges and support services for special secondary boarding schools in ONRS. This study of piloting can be defined as a ‘small study to test research protocols, data collection instruments, sample recruitment strategies, and other research techniques in preparation for a larger study. The purpose of this pilot study is to check the clarity of the items and conduction the protocol of the administration, which means the researcher preferred to allow the students to fill out the questionnaire at their dormitory after giving them clarification on the questionnaire. The respondents preferred to fill out the questionnaire at their dorm because they needed to take time and fill it appropriately. A pilot study is one of the important stages in a research project and is conducted to identify potential problem areas and deficiencies in the research instruments and protocol prior to implementation during the full study (Zailinawati Abu Hassan FRACGP, Peter Schattner MMed & Klinik Keluarga, 2006).

The place of piloting and target group were the students from Ambo Special Secondary Boarding School in ONRS. It serves the students from grades 9 -12. The respondents were randomly selected from each class, five respondents from each class. The total number of respondents was 35. From the selected respondents 25 students clearly and appropriately filled out the questionnaire and 10 of them missed some items which was very important. Therefore, I dropped them from the analysis.

Administration Procedures: The document provides a comprehensive overview of the administrative procedures related to the questionnaire, specifically highlighting the challenges the students faced in boarding school settings. It includes the formulation of a detailed protocol for the

distribution, completion, and collection of the questionnaires, while also addressing critical factors such as confidentiality. I informed the participants about the study's objectives and clarified any questions they had. The questionnaire was given to the students to be filled in their dormitory settings, this is because of allowing them sufficient time to engage with the questions and respond using the designated scale. Additionally, I considered logistical factors, including the timing and location of the administration, to ensure a smooth process and to create a comfortable atmosphere for respondents to provide their insights.

Item Clarity: To begin with, the researcher examines the clarity of the items within the questionnaire. This includes a detailed review of each question to ensure that it is clear and unambiguous after the pre-piloting test has been conducted. To collect feedback on participants' understanding of the questions, the researcher might perform informal interviews or organize focus groups with a limited number of participants. This stage is vital, as ambiguous items can lead to misunderstandings, which may ultimately compromise the integrity of the study's findings.

Rating Points of the Questionnaire: The process of establishing the rating points for the questionnaire involves selecting the Likert scale as the preferred scale type, which comprises five response options: 5 strongly agree, 4 agree, 3 neutral, 2 disagree, and 1 strongly disagree. The selection of these rating points is crucial, as it can profoundly affect respondents' perceptions and their responses to the survey items. Therefore, meticulous attention is devoted to ensuring that the scale is congruent with the research objectives and effectively reflects the attitudes or behaviors of the participants.

Social Desirability of Items: The phenomenon of social desirability bias was evident in both the pilot and main studies, as participants tended to provide responses that they perceived as more socially acceptable, rather than reflecting their authentic feelings or behaviors. To address this issue, the researcher utilized triangulation methods, conducting interviews with both students and teachers. This process revealed that one specific sub-scale, pertaining to the social desirability items, was excluded from the analysis. Consequently, the researcher aimed to ensure that the data collected accurately represented the participants' genuine responses.

Post-Piloting Phase

1) Reliability Analysis

The reliability of the internal consistency of the scales was found using Cronbach's alpha coefficient and split half. To this end, the subscales and overall coefficients of reliability obtained with the original developed scale and the one obtained in this study were systematically compared and analyzed. (Peterson, 1994) indicated a reliability of 0.7 Cronbach's alpha is an acceptable coefficient.

Table 2. Reliability indexes of Cronbach's Alpha and Guttman Split-Half Coefficient on psychological challenges

Reliability Statistics			
Cronbach's Alpha	Part 1	Value	.710
		N of Items	3 ^a
	Part 2	Value	.598
		N of Items	3 ^b
	Total N of Items		6
Correlation Between Forms			.544
Spearman-Brown Coefficient	Equal Length		.715
	Unequal Length		.715
Guttman Split-Half Coefficient			.712

a. The items are: PsyCh3, PsyCh4, PsyCh1.

b. The items are: PsyCh2, PsyCh5, PsyCh6.

The analysis indicated in the above table is that the assessment of psychological challenges reveals a strong internal consistency of reliability reflected in a Cronbach's alpha of .710. This result implies that the items inside the table the reliability statistics make across. The split-half reliability score of .712 supports this conclusion indicating that both results of the scale consistently assess the same construct.

Table 3. Reliability indexes of Cronbach's alpha and Guttman Split-Half Coefficient coefficient of support services

Reliability Statistics	
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Cronbach's Alpha	Part 1	Value	.710
		N of Items	5 ^a
	Part 2	Value	.562
		N of Items	4 ^b
	Total N of Items		9
Correlation Between Forms			.484
Spearman-Brown Coefficient	Equal Length		.743
	Unequal Length		.745
Guttman Split-Half Coefficient			.712

a. The items are: SUPSR1, SUPSR2, SUPSR3, SUPSR4, SUPSR5.

b. The items are: SUPSR5, SUPSR6, SUPSR7, SUPSR8, SUPSR9.

Table 3 shows that the analysis of a Cronbach's alpha of .710 on support services shows that the items in this part of the survey are consistent with each other. This means that the questions are moderately related and likely measure the same idea. A Split-Half Coefficient of 0.712 of support services indicates that the two groups of questions in this part are moderately consistent with each other, suggesting they measure similar things.

As displayed above in the Tables above, the internal consistency and split-half measure for each of the six components of the psychological challenges assessment devices were generated. The computed Cronbach's alpha values of the reliability coefficient revealed a statistically significant and acceptable level of reliability across each of the six components of the psychological challenges assessment device (PCAD). The magnitude of the internal consistency coefficients ranged from .658 to .710. Hence all of the factors were scores >0.5 Cronbach alpha coefficient, and all the components of the psychological challenges assessment device (PCAD) possess intra-factor reliability and adequate level of reliability in utilizing the instrument in the context of the psychological challenges. Based on the theoretical assumption of reliability several scholars stated that the closer Cronbach's alpha coefficient to 1.0 is the greater the internal consistency of the items in the scale (Kazykhankyzy & Alagözlü, 2019). Furthermore, George and Mallery provided the rules of thumb e. i., if the value of alpha is >0.9 = Excellent, >0.8 = Good, >0.7 = Acceptable, >0.6 = Questionable, >0.5 = Poor, and <0.5 = Unacceptable. From this theoretical assumption, it is possible to conclude that all the factor of the psychological challenges assessment device has an

acceptable (ranging from .710 to .712) Cronbach alpha and 0.710 to .712 split-half reliability coefficient. This implies that all six components of the psychological challenges assessment device had adequate sound for the usability of the instrument into the context it was adapted and created.

The post-pilot study conducted on the psychological challenges faced by students in special boarding schools, as well as the analysis of available help services, reveals significant insights into the mental health landscape within these educational environments. The research highlights on psychological issues, including homesickness, academic pressure, Emotional and Psychological States, and difficulty in adjusting to new school, which are prevalent among students (Khusumadewi et al., n.d.). In addition, the study evaluates the effectiveness of existing support services, such as professional counseling services and teacher peer support programs and extracurricular activities. In this section, the study was conducted both quantitative and qualitative method. The findings underscore the necessity for enhanced mental health resources and appropriate interventions to better support the emotional well-being of boarding school students, ultimately nurturing a more conducive learning atmosphere.

2) Factor analysis

a) Assumptions of Exploratory Factor Analysis

Multivariate normality of data was examined for psychological challenges and support services scale before the data were processed. KMO and Bartlett's Test were also examined for the construct to check the measure of how suited the data were for Factor Analysis. The test measures sampling adequacy for each variable in the model and for the complete model. KMO returns values between 0 and 1 for all the constructs measured. A rule of thumb for interpreting the statistic: KMO values between 0.8 and 1 indicate the sampling is adequate. A minimum acceptable score for this test is 0.5 (Nkansah, 2011). The KMO results for the items factor analyzed show a sampling adequacy was reached with a significant level. Accordingly, KMO results for psychological challenges and support services measure was .789 and the KMO result for the support servixes was 7.76. Further, the Homoscedasticity Plot: was checked using a scatter plot and the result shows that the amount of distance from the line to the dot did not marginally increase at it moves up the line (Nkansah, 2011). This suggests that the data are homoscedastic. It also means the average distribution of scores of the independent, mediating and dependent variables in the different scales is approximately normal.

Results from Exploratory Factor Analysis of the Psychological challenges and support services Scale (PCSSS)

Table 6: KMO and Bartlett's Test on Psychological Challenge

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.789
Bartlett's Test of Sphericity	Approx. Chi-Square	820.694
	Df	105
	Sig	<.001

Table 7. KMO and Bartlett's Test on Support Services

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.776
Bartlett's Test of Sphericity	Approx. Chi-Square	505.222
	Df	36
	Sig.	.000

The result of KMO and Bartlett's Test was found to be .789 which shows that sampling adequacy has reached at a significant level. The following table depicts the result of exploratory factor analysis showing extracted factor structures.

In connection with this qualitative research question, two groups of participants have been recognized. The first group is formed by teaching staff and students, and the second group is represented by the head and the vice. They reported that they provide support services to students from teachers and peers to help them adjust to school challenges. However, they noted that professional school guidance and counseling services are not available to support students in dealing with psychological challenges related to school adjustment. All participants mentioned that students handle problems on their own, with teachers, or sometimes with school administrators to avoid burdening others and themselves. They also engage in extracurricular activities like outdoor exercise. Participants generally stated that they do not have access to professional school counseling

or therapy to address their psychological difficulties, as indicated by t1, t2, t3, t4, and A1, A2, A5, A7, indicated.

b) Convergence of Agreement

The convergence to the agreement with the expert judgment evaluates the questionnaires professionally and they evaluate the relevant items and reject the items which seem trivial or which was not valid and relevant. All the experts agreed on six items on psychological challenges and nine items on support services. We all agreed on the items which are relevant and address the challenges of the boarding school and the support services which implemented in boarding school environment.

Table 1: Likert scale analysis through Exploratory and Confirmatory Factor Analysis

Pattern Matrix^a

	Factor				
	1	2	3	4	5
I wish I had stayed with my family and learned at the nearby school.	.649				
I feel homesickness when I am in bed at this new school.	.637				
Sometimes, I find myself overwhelmed by feelings of isolation and a strong desire to be with my family.	.467				
I could not sleep in the absence of my parents' attachment for the last 12 months.	.402				
I miss my family and it is challenging for me to focus on my academic task.	.551				
I am offered the provision of tutoring and study groups in the class.		.674			
I am offered in an academic counseling to be successful and excel in my studies.		.574			
I have the opportunity to access guidance and counseling services in this school.		.545			
I blame my parents for facing such challenges			.998		
Teachers give me support when I feel homesickness in the school.				.676	
My school counselling and guidance office supports me.				.355	

Having a discussion about any problem with friends is very easy.	
It is difficult to get help form the school counseling and guidance office.	
I and my friends get the Access to healthcare facilities and medical professionals to address our health needs.	.837
I have got the opportunities to participate in extracurricular activities like; sports, arts, clubs, and the like.	.585

Extraction Method: Maximum Likelihood.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

c) Factor Structures

A factor structure (FS) is the correlational relationship between a numbers of variables that are said to measure a particular construct (Brooks et al., 2006). The psychometric analysis does not allow us to support the original uncorrelated structure of the psychological challenges and support services according to the newly opened government boarding school context. Therefore, despite a great improvement and sound psychometric properties are observed when factors are allowed to correlate. In FS conspicuously identified the components of psychological challenges and support services. Thus the items which is identified above means, it keeps its psychometric properties, it has sound psychometric properties. This means that, an instrument which is reliable, valid and an instrument with its factor structure is clearly articulated. Therefore, all analysis of this study is depend on the psychometric analysis.

Two basic forms of factor analysis were conducted. Exploratory Factor Analysis (EFA) was conducted to explore the existence of the factor structures for psychological challenges and support services. Exploratory Factor Analysis with Varimax Rotation¹ was used to extract the factor solutions. Its ultimate goal was to come up with a pattern matrix where acceptable values of KMO, factor loadings, and factor correlation matrix, etc. are satisfied. Varmax Rotation with Kaisar Normalization, and Maximum Likelihood Estimation (MLE) and an absolute value of the standardized factor loading of greater than 0.4 was set to run the analysis. Maximum Likelihood Estimation helps to estimate parameters for a model and specify explicitly of the expected relations between the factors and the endogenous variables. Varimax rotation as a statistical technique in the factor analysis helped to clarify the relationship among factors, simplifies the loadings of items by

removing the middle ground and more specifically identifying the factor upon which data load. The following table indicates the Varimax Rotation with Kaiser Normalization, and Maximum Likelihood Estimation loading.

Table 6: Results from exploratory factor analysis of Psychological challenges and support services

Rotated Component Matrix^a					
	Component				
	1	2	3	4	5
PsyCh1	.733				
PsyCh2	.754				
PsyCh3	.698				
PsyCh4					.808
PsyCh5					
PsyCh6	.643				
SUPSR1		.732			
SUPSR2		.644			
SUPSR3		.662			
SUPSR4			.807		
SUPSR5			.754		
SUPSR6				.529	
SUPSR7					
SUPSR8				.812	
SUPSR9		.514			

Extraction Method: Principal Component Analysis. (PsyCh=Psychological Challenges, SUPSR=Support Services.)

Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 5 iterations.