Developing a Standardized Scale to Measure Teachers' Perception and Attitude Towards Apprenticeship Embedded Degree Programme

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Abstract

In the framework of the Apprenticeship Embedded Degree Programme (AEDP), as envisioned in NEP-2020, this study aimed at developing a standardised Scale Towards an Apprenticeship Programme. Hence, the objective is to construct, develop and standardisethe Teachers' Perception and Attitude Scale Towards Apprenticeship Programme" (TPAS-TAP). The researchers used a five-point Likert scale in this study (Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree). 310 teachers from different high schools, colleges, and universities (assistant/associate/professors) working in India's West Bengal's "Rarh Region".The data were analysed with the help of a quantitative research technique (through statistical software). The final TPAS-TAP version has 25 items in it after the item analysis. The scale is appropriate for the study, according to Cronbach's Alpha, which was 0.856. The Factorial validity and the Split-half technique were revealed to be 0.84, indicating that the study was acceptable and reliable. The researcher employed the structural equation model and goodness of fit index (CMIN/DF= 2.981) to analyse and study the relationship between components. The RMSEA was 0.040; IBM SPSS (V-28) Amos software was used to analyse the Scale. This research can provide valuable insights for policymakers and researchers on shifting teachers' perspectives and attitudes as stakeholders. Additionally, it can shed light on the various dimensions that can be utilisedto effectively manage the new UGC degree program, which incorporates an apprenticeship, and comprehend the process of constructing and developing research scales.

***Keywords**: Development, Perception, Attitude, Construction, Apprenticeship Scale, TPAS-TAP*

INTRODUCTION

Klausmeier and Goodwin quoted, "Good standardized tests must meet the criteria of validity, reliability and usability."A study on the "Future of Indian Apprentices" conducted by Team Lease EdTech, a prominent B2B education technology company, has shed light on the current state of India's degree apprentice ecosystem. According to the report, only a handful of universities in India offer bachelor's degree apprenticeship courses, with approximately 63,000 active bachelor's degree apprentices. However, the National Education Policy 2020 has opened

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doors for more universities to introduce bachelor's degree programmes (GOI, 2020).As per the UGC Guidelines, Higher Educational Institutions (HEIs) now have the choice to incorporate apprenticeship or internship programs in any UG degree program that the UGC identifies. This move focuses on outcome-based learning in degree programs and allows students to demonstrate their job-ready skills (H M Naveen, 2022). NEP-2020 Higher Education has brought guidelines from the Apprenticeship Embedded Degree Program (AEDP) for more student-oriented career development (Gorai & Angadi, 2021). According to Marksteiner et al. (2013), social science research has proven the relevance of examining interactions from the perspective of individuals involved in the event and investigating how they perceive, interpret, and bias (Aronson, Wilson, and Akert, 2010). Perception and attitude are two subjective aspects that might influence the effectiveness of students' learning and are closely related to teachers (Calderon et al., 2018). When discussing the concept of Attitude, Baldwin (1901-1905) was the first to describe it as a "preparation for a series of actions or attention". He also suggested that attitude can be expressed through various constructs. Latchanna and Dagnew (2009) define attitude as a mental state that encompasses feelings and beliefs and is an essential concept for comprehending human behaviour. Beliefs are linked to success in the implementation process. Lennartsson (2008) states that having the right attitudes and perceptions is crucial for enhancing students' competency in the learning process. In today's education system, the way students and teachers think, their abilities, creativity, problem-solving skills, attitudes, and perceptions all play a significant role in improving any subject. The concept of attitude, first introduced by Thurstone in 1931, is centered around an individual's emotional response to a psychological object. Allport's 2008 summary highlights how mental and nervous states can dynamically impact positive or negative attitudes. Handayani (2011) notes that an object's perceived goodness or badness influences how a person behaves towards it. Perception plays a critical role in human knowledge and communication, as Efron (1969) argued that all conceptual knowledge depends on primary consciousness. In determining the value of something, human perception is key in assessing whether it is beneficial or detrimental to society. As such, researchers have placed significant emphasis on studying perception and attitude. Consequently, the researchers were informed about the study to understand and examine the teacher's perceptions and attitudes concerning AEDP. Therefore, the "Teachers Perception Attitude Scale-Toward Apprenticeship Programme" (TPAS-TAP) was developed. As a result, adopting research procedures for data collection and standardised instruments for measuring perceptions and attitudes may greatly benefit such investigations (Avasthi, Varma, Nehra and Das 1992).

The Objective of the Study

- To develop and standardize the "Teachers' Perception and Attitude Scale -Towards Apprenticeship Programme (TPAS-TAP).

Methodology

This was a quantitative systematic developmental study (Khan, Nabi, Khojah, and Tahir, 2021). The study was conducted using an online survey questionnaire as the primary source of data collection. Investigators employed the Snowball sampling method to select the study participants (Khan and Rahman, 2016), where each participant was asked to refer someone who could be part of the survey based on the eligibility criteria. For constructing and developing this scale, the authors used various statistical techniques. On numerous data sets obtained at various phases, descriptive statistics, EFA with a reliability test, and CFA with reliability and validity assessments were performed using jamovi version 2.3.2 (SPSS), SPSS-28, and AMOS statistical software packages.

Participants and Sites

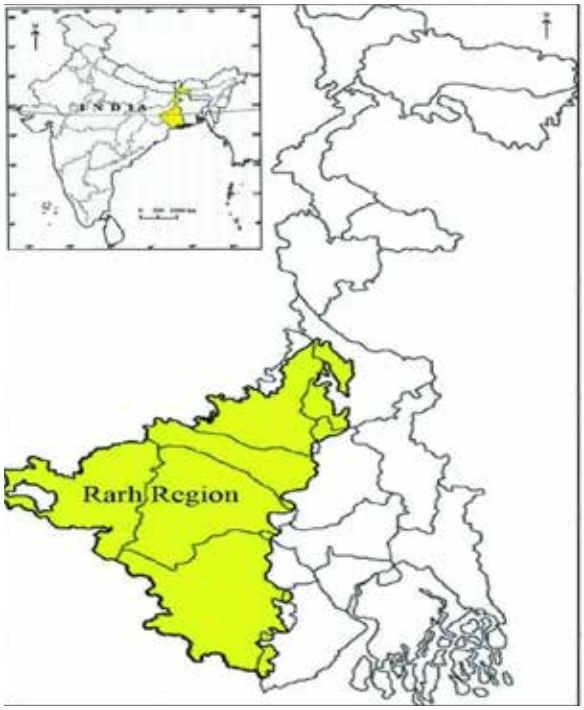
To obtain a precise understanding of the context of Apprenticeship Embedded Degree Programme (AEDP) in higher education, a group of 310 teachers from various Educational Institutions (EIs) situated in Birbhum, Paschim Bardhhaman, Purba Bardhhaman, Jhargram, Bankura, Purulia, and the north-western regions of Paschim Medinipur in the Rarh area of West Bengal, India (Figure 1), were selected as participants (Chakrabarty and Mandal, 2022). The survey was administered to teachers from Educational Institutions (EIs) affiliated with State Government, Government grant-in-aid, Local Bodies, Private unaided schools and general degree colleges. The sample included male and female teachers from various institutional areas and academic disciplines such as arts, sciences, and commerce. The survey was translated into English for ease of comprehension. The demographic details of the participants are presented in Table 1.

Table1

Demographic details of the Respondents (No. of Respondents=310)

	Demographic/ Predictor	Sub-Demographic	Used code dataset	No. of Frequency (N)	Percentage (%)
Teacher	Gender	Male	1	171	55.16
		Female	2	139	44.83
	Institutional Area	Rural	1	133	42.90
		Urban	2	177	57.09
	Educational Stream	Arts	1	153	49.36
		Science	2	107	34.51
		Commerce	3	50	16.12

Figure 1: Location Map of the Study Area



Source: Chakrabarty and Mandal (2022)

Background of Scale Development

Scales are usually produced due to the following factors: a practical or commercial requirement, theoretical advancements, or empirical progressions (Irwing and Hughes, 2018). A scale, often known as a test, is essentially a standardised questionnaire or a list containing test items that must be administered and scored by strict guidelines. Its purpose is to assess one or more underlying psychological constructs or latent variables that are not readily apparent (Fabrigar and EbelLam, 2007). The building or developing a scale is gathering and putting together the most suitable components or aspects of a given architecture that serve as test questions (Chadha, 2009). Tripathi (2003) outlined five steps for the scale development: (1) defining the measured trait assuming it is unidimensional; (2) generation of a pool of potential question items, preferably 80–100, rated on a 5- or 7-point (from 1 = strongly disagree to 5/7 = strongly agree) Likert response scale; (3) review and rating of the items by a panel of experts on a 1–5 scale on how favourably the items can measure the construct (from 1 = strongly unfavourable (pilot test). Following the standard scale development process proposed by Tripathi (2003); Kyriazos and Stalikas (2018); Sharma et al.(2022); and Kundu et al. (2022), a scale (TPAS-TAP) was developed to assess teachers' perceptions and attitudes towards AEDP. Using ideas from previous scale development methodologies, the researcher created and implemented a Scale Development Comprehensive Flowchart (SDCF) as shown in Figure 2. This illustrates that the overall process has several parts, and each further subdivided into a few additional sub-steps.

Figure 2: Scale Development Comprehensive Flow chart (SDCF)

SDCF presents the systematic construction and standardization process of the research tool utilized in this study. The research tool was developed following a series of well-defined steps, which are clearly outlined below.

Conceptualisation of the Tool

Selecting a topic and defining objectives are crucial steps in conducting research. Researchers must then identify the appropriate population and sample and the necessary research tools for data collection (Arunkumar, 2016). If suitable tools are unavailable, researchers may create their own in consultation with an expert. In this particular study, the "Teacher Perception Scale - Towards Apprenticeship Programme" (TPS-TAP) and the "Teacher Attitude Scale - Towards Apprenticeship Programme" (TAS-TAP) were jointly developed by the researchers to align with their objectives. To design these instruments, the researchers extensively reviewed textbooks, reference materials, journals, periodicals, newspapers,

among others, to gain a better understanding of teachers' attitudes and perceptions. The initial list of 43 items was then condensed into seven dimensions based on the identified actions.

Preparation of Items

Developing tools began with a study of current research studies, national and international reports, recommendations, legislation, and the availability of published tools (Sharma et al., 2022). From this study, the researcher grasped key dimensions of apprenticeship in the Indian context and developed a few items. In this article, the national government of India and local agencies are analysed for their implementation of vocational education and skills training programmes for indigenous women (Dagar, 2022). Through this analysis, readers will understand the value of apprenticeship, vocational education, and skills-based education for all students and some of the prepared items. (Lasrado and Zakaria (2019); Pepper et al. (2022); Sharma and Nagendra (2016); Lester and Bravenboer (2020); UUK, (2019); (Ryan and Unwin, 2001); UGC Guidelines for Higher Education Institutions to Offer Apprenticeship/Internship Embedded Degree Programme, (2020), and Mulkeen et al. (2019) are indeed a handful of good studies that provide evidence for the need to understand perceptions and attitudes,after undergoing this complete analysis; the researcher recognised the growth of crucial elements pertinent to the study, including awareness, usefulness, breadth, access and equitable chances, social connectedness, and learning outcome—quality control, competence, truthfulness, assessment, etc. Scale construction and development used these elements as a reference. Another crucial phase in creating a tool is item wording since wording a question might impact the result (Saris and Gallhofer, 2007). The researchers benefitted from the insights of a team of 14 highly-regarded education experts, including 5 professors, 4 associate professors, and 5 assistant professors from renowned institutions such as Visva-Bharati, Aligarh Muslim University, South Bihar Central University, NCERT (RIE), Central University of Gujarat, and Delhi University. The 'TPS-TAP' and 'TAS-TAP' tools were further refined with contributions from prestigious universities such as Jamia Millia Islamia, Savitribai Phule Pune University, and Guru Gobind Singh Indraprastha University. The experts recommended all constructs and rated using a 5-point Likert scale, with scores ranging from 5 (strongly agree) to 1 (strongly disagree) and vice-versa for negative items. After researchers Finalized dimensions for this tool which is discussed below. The study involved 43 statements for both the collage TPS-TAP and TAS-TAP, with the number of objects in each dimension outlined in Table2.

Dimensions of Perception

- ***Awareness (A):*** To be aware is to possess consciousness of something. Constructs can be within the knowledge or awareness of teachers, as noted by Kumar and Amin (2021). Further more, stakeholder awareness can play a critical role in the successful implementation of rules, regulations, norms, and other such measures. Based on this crucial aspect, the researcher can confidently develop items for their study.
- ***Breadth (B):*** The AEDP program offers a flexible duration for prospective learners, as per established guidelines. To convey the same idea, some researchers prefer to use the term "breadth." Fuller & Unwin's (1998) study on "Creating a Modern Apprenticeship: A Critique of the UK's multi-sector, social inclusion approach" highlights the significance of a diverse group of apprentices possessing a comprehensive understanding of their future roles, knowledge, and skills to meet evolving professional expectations. Based on this, researchers have devised various criteria to evaluate perception towards AEDP.

- ***Access and Equal Opportunities (AEO):*** Moreover, Modern Apprenticeship providers should actively develop equal opportunities policies and practices to ensure that participation is extended beyond non-traditional groups (Fuller and Unwin, 1998). Unwin and Wellington's (1995) account of the early implementation of the prototype programmes suggests that the challenge of extending the programme to non-traditional sectors should not be underestimated. So here, the researcher also used "Access and Equal Opportunities" as a dimension for the perception of stakeholders and in the Apprenticeship/Internship embedded Degree Programme's UGC guidelines have mentioned in the general Provisions.
- ***Learning Outcome (LO):*** The scope of the Apprenticeship/Internship Embedded Degree Programme offered by Higher Education Institutions has been clearly outlined in the UGC guidelines. Learning Outcome has been identified as a crucial factor in this programme's success, as stakeholders' perception of the AEDP is heavily influenced by the researcher-designed learning outcome-related items (UGC Guidelines for Higher Education Institutions to Offer Apprenticeship/ Internship Embedded Degree Programme, 2020).

Dimensions of Attitude

- ***Quality Management (QM):*** Hodkinson and Hodkinson conducted extensive research on the crucial matter of VET programme quality in 1995. According to Fuller and Unwin's 1998 perspective, a "modern" apprenticeship should establish process criteria to enhance the learning experience's quality and outcome indicators to track results. To gauge stakeholders' attitude towards AEDP, the researchers confidently utilized "Quality Management."
- ***Truthfulness (T):*** The variations in truth-telling stem from the complex interaction between autonomy, beneficence, education, and stakeholders. In today's society, stakeholders tend to be cautious about being misled, as noted by Bernard Williams in 2010. This attitude can be used to support the researcher's perspective on AEDP.
- ***Assessment (A):*** The UGC guidelines for the Apprenticeship/Internship embedded Degree Programme have outlined certain requirements, including assessment. The researcher has focused on the AEDP aspect of this scope(UGC Guidelines for Higher Education Institutions to Offer Apprenticeship/Internship Embedded Degree Programme, 2020).

Table 2

Statements distribution of under constructs

SL.NO	Constructs		No. of Items	
	TPS-TAP	**Total**	**Positive**	**Negative**
1.	Awareness	6	3	3
2.	Breadth	6	4	2
3.	Access and Equal Opportunities	7	4	3
4.	Learning Outcome	5	3	2
	TAS-TAP			
5	Quality Management	6	3	3
6	Truthfulness	8	5	3
7	Assessment	5	3	2
	Total	**43**	**25**	**18**

Pre-tryout Session

Experts Consultation (Validity), Pre testing and Items analysis of the Scale

The researcher effectively compiled a booklet of instructions and presented it to a panel of 12 specialists for evaluation. The feedback received was carefully analysed to ensure that the items' language, constructs, and overall acceptability were appropriate. A research scale was distributed via Google Forms to gather additional data responses was collected through email. 65 teachers used the scale for a pre-tryout session from Higher Secondary schools, colleges, and universities in West Bengal's 'Rarh Region' participated. 53.85 (35 teachers) per cent are from schools, 30.77 (20 teachers) per cent are from colleges, and included 15.38 (10 teachers) per cent are from universities. Males represent 59.86 per cent of the population, females represent 40.14 per cent, and from urban areas 53.94 per cent, and the rural regions 46.06 per cent of the people. The questionnaire also included a suggestion box to refine the items further, as some suggestions were utilised during the revision process. Some professional comments and ideas are included below.

Validity

The level to which a scale correctly depicts the idea of interest is referred to as its validity. The degree to which a tool measures what it is intended to measure is described as its validity(Sharma et al., 2022). In other words, only when a tool performs its designed functions is it deemed valid. For the scale, the investigators conducted Face Validity and Content Validity.

(a) ***Face Validity:*** Face validity deals with the appearance of the scale. A scale is said to have face validity when it "looks like" measuring what it is meant to measure by appearance. Before constructing the (TPAS-TAP), the investigators reviewed the literature. Also, while constructing the TPAS-TAP, suggestions provided by the experts were incorporated. Thus, the face validity of the TPAS-TAP was established by the investigator like...

"While Integration of A/I in a general degree programme- This sentence does not need to be repeated in statements. Try to make 25 statements here also which are more important to you. Others may be deleted for standardisation tools. So, it can be cut. At first, you write in. May Not, Maybe will not be suitable in statements. So, it would help if you put either positive or negative statements, e.g., SL—no 39, 40. I have modified it to green colour. Other sentences you also change like these – Expert No 4".

"Make use of user-friendly language while framing statements. Add some comments on the lacunas of the present education system. Please, ensure that all the statements are pretty much constructed equally important. Provide a realistic image. You can go through NPE 2020 policy. It will help you to construct more relevant statements. -Expert No 10".

(b) ***Content Validity:*** Content validity is a measure of the degree to which data collected using the TPAS-TAP represents the content of commitment being measured. It is referred to as logical or rational validity. The TPAS-TAP constructed by the investigators was also given to experts for their valuable suggestions for ensuring content coverage concerning the components of the scale (Sansanwal, 2020). The investigators considered and incorporated their feedback and suggestions for the final construction of the tool. Thus, the content validity of TPAS-TAP was established by the investigators.

"See the grammatical inconsistency; a confusing statement should be avoided. It would help if you saw the grammatical inconsistencies in all statements. Write all statements in the present tense. Do not use a double negative in a single sentence. Avoid words like should/must etc. Do not just negate the positive sentence for negative

aspects; instead, think of a negative part of the problem/topic.- Expert No 8".

"The tool is well designed. The items incorporated in the scale are closely related to each other. Expert No 12".

Following the expert's consultation and discussion, considering 6 of the 43 statements were eliminated. The remaining 37 items were reconstructed according to constructs for the TPS-TAP and TAS-TAP preparation collages.

Pre-testing and Items analysis

The accuracy and variability of test results are strongly influenced by item difficulty (Thorndike et al., 1991). Here researcher changed the phrasing of items and removed two items. The correlation between each item and the overall score was then determined, followed by the discrimination index (Sharma et al., 2022). According to Ebel and Frisbie (1986), a discrimination index of 0.40 and higher indicates good items; 0.30 to 0.39 indicate reasonably good items; marginal items from 0.20 to 0.29; and less the 0.20 display poor items. Here followed this parameter, and out of 43 items, 6 items range was below 0.30 (3,8,11,17,34,39), so deleted it is not measured directly to study variables. According to the results, the Kaiser- Meyer-Olkin (KMO) value was 0.819, higher than its cut-off value of 0.7, indicating that the samples utilised were enough to generate factors. The range has been offered by Kaiser as follows: ">0.9 is marvellous, > 0.8 meritorious, >0.7 middling, >0.6 mediocre, >0.5 miserable, < 0.5 unacceptable." The Rotated Component Matrix revealed 3 items with cross-loading (of which 4 were below the.30 range of DI). These 3 items were removed from the analysis list, and the remaining 34 items had a stronger KMO value of 0.9. The remaining 34 items are significant and high-quality indicators for determining how people feel about and approach the apprenticeship programme and ready big sample for pilot testing. In summary, the researcher skillfully reconstructed a scale of important professional suggestions and viewpoints, including insightful comments and ideas from professionals in the field.

Pilot study

Researchers divided the research tool into two sections. The first section required teachers to provide personal information, including their name, gender, location, institute name, and email address. In the second section, the questionnaire focused on the teachers' perceptions and attitudes towards the apprenticeship-embedded degree program. The research pilot involved the use of Google Form, which was distributed via email and WhatsApp numbers to school teachers, college teachers, and university professors in the Rarh region of West Bengal (Arun kumar, 2016). A total of 310 out of 450 teachers responded to the scale with clear instructions and guarantees provided, and the pilot study was completed over a two-month period. Upon collecting all data, positive and negative statement scores were assigned to facilitate item analysis.

Procedure for Items analysis

In order to analyze the items, the researchers utilized both the 'r' value and the split-half method (Sansanwal, 2020). Only items with an 'r-value greater than 0.5 ($r > 0.5$) were selected, while the rest were rejected. Additionally, Cronbach's alpha test was implemented to evaluate the items. Calderon Jurado & Morilla García (2018) utilized Alpha's Cronbach to demonstrate the internal reliability of the questionnaire. For TPS-TAP & TAS-TAP, 25 statements were chosen, and 9 statements were eliminated based on the results of the 'r' correlation study. Table 3 displays the researchers' findings.

Table 3

34 Item's total r-correlation

Items Number	'r' value	Result	Items Number	'r' value	Result
1	0.689	Selected	18	0.732	Selected
2	0.802	Selected	19	0.654	Selected
3	0.415	Rejected	20	0.567	Selected
4	0.267	Rejected	21	0.509	Selected
5	0.752	Selected	22	0.176	Rejected
6	0.743	Selected	23	0.388	Rejected
7	0.654	Selected	24	0.738	Selected
8	0.676	Selected	25	0.686	Selected
9	0.786	Selected	26	0.835	Selected
10	0.796	Selected	27	0.687	Selected
11	0.287	Rejected	28	0.786	Selected
12	0.666	Selected	29	0.312	Rejected
13	0.765	Selected	30	0.567	Selected
14	0.623	Selected	31	0.199	Rejected
15	0.256	Rejected	32	0.509	Selected
16	0.578	Selected	33	0.645	Selected
17	0.225	Rejected	34	0.805	Selected

Source: The researcher used "jamovi version 2.3.2, Software."

When it comes to tests or scales, it is crucial that they are reliable and consistently measure what they are intended to. The TPS-TAP & TAS-TAP have a high level of reliability due to the Likert technique used to create the Scale. However, Garrettee (1959) suggested that a longer test can result in a more accurate estimation of score reliability by reducing the likelihood of temporary and variable disruptions accumulating in one direction.

Reliability of Items

The split-half reliability divides the test of a single knowledge domain into two parts and presents both parts to a group of students simultaneously. Scores on both parts of the test are correlated. Reliable tests are highly correlated and indicate that they perform equally (or poorly) on both halves of the test.

Table 4

Valid and Excluded Items

		No of items	Percentage (%)
Cases	Valid	25	73.52
	Excluded	9	26.47
	Total	34	100.0
(a) List wise deletion based on all variables in the procedure.			

The split-half test is a reliable method for evaluating the internal consistency of a test. It effectively measures the individual contribution of each test component towards the overall measurement of the object being tested. As per Table 4, only 9 out of 34 items were excluded, leaving 25 items that were divided into two parts. Results from Table 5 showed that both Part 1 and Part 2 had Cronbach Alpha values of 0.864 and 0.850, respectively. Furthermore, the combined tool (TPAS-TAP) yielded a Cronbach's Alpha of 0.856, an acceptable value per Table 7.

Table 5

Split half reliability for Part 1 & Part 2

Cronbach's Alpha	Part 1	Value	.864
		N of Items	14a
	Part 2	Value	.850
		N of Items	11b
		Total No. of Items	25
Correlation Between Forms			.754
Spearman-Brown Coefficient	Equal Length	.854	
	Unequal Length	.854	
Guttman Split-Half Coefficient		.840	
(a) The items are TA1, TA2, TA3, TB4, TB5, TB6, TAEO7, TAEO8, TAEO9, TAEO10, TAEO11, TAEO12, TLO13, and TLO14. (b) The items are, TQM15, TQM16, TQM17, TQM18, TT19, TT20, TT21, TAs22, TAs23, TAs24, and TAs25.			

Source: Data computed through IBM SPSS 28.

Reliability testing is a critical task for item analysis by measuring the internal consistency and properties of the scale (Hair et al., 2006). Cronbach's alpha establishes the scale's reliability, which is "a commonly applied measure in the Likert scale survey questions". The researchers tested Cronbach's alpha using "SPSS". It is shown in Table 5 and 6.

Table 6

Cronbach's Alpha value for TPS-TAP & TAS-TAP

Variable Scale	Cronbach's Alpha	No of Items
TPS-TAP	0.864	14
TAS-TAP	0.850	11

Source: Data computed through IBM SPSS 28

According to Taber's research in 2018, values of Cronbach's alpha between 0.70 and 0.90 are considered acceptable. To assess the internal consistency of the items, a judgment analysis is conducted using Cronbach's alpha chart. A score of 0.5 is deemed unacceptable, while scores between 0.5 and 0.6 are considered poor. A score of 0.6 to 0.7 is questionable, while scores between 0.7 and 0.9 are acceptable and excellent. Based on this assessment, the TPS-TAP and TAS-TAP tools combined (shown in Table 6) fall into the 0.8-0.9 group, making them appropriate tools for the task at hand.

Table 7

Cumulative Cronbach's Alpha value for Scale (TPAS-TAP)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
TPAS-TAP	0.856	25

Source: Data computed through IBM SPSS 28.

A single test administration is necessary for Cronbach's Alpha test reliability technique to accurately evaluate a particular test's reliability. The scale's elements have higher internal consistency the closer the value is to 0.9. TPAS-TAP Table 7's "0.856" Cronbach's Alpha score, which is near 0.9, shows that the TPAS-TAP has a high level of internal consistency. Therefore, it may be said that the TPAS-TAP is trustworthy. Table 8 displays each item's mean, SD, item-rest correlation, and Cronbach's Alpha, though "jmovi version 2.3.2 (SPSS)".

Table 8

Item Reliability Statistics Final draft for tool

Item code	Mean	SD	Item-rest correlation	Cronbach's α
TA1	3.88	1.45	0.678	0.802
TA2	3.96	1.33	0.567	0.767
TA3	3.78	1.23	0.567	0.745
TB4	3.65	1.32	0.756	0.868
TB5	3.45	1.52	0.876	0.869
TB6	3.63	1.45	0.786	0.857
TAEO7	3.96	1.25	0.775	0.765
TAEO8	3.63	1.16	0.745	0.745
TAEO9	3.69	1.27	0.867	0.968
TAEO10	3.88	1.35	0.778	0.867
TAEO11	3.56	1.34	0.578	0.869
TAEO12	3.65	1.27	0.756	0.776
TLO13	3.45	1.34	0.794	0.956
TLO14	3.67	1.34	0.745	0.914
TQM15	3.67	1.18	0.796	0.956
TQM16	3.96	1.34	0.786	0.907
TQM17	3.78	1.26	0.876	0.867
TQM18	3.73	1.22	0.656	0.669
TT19	3.56	1.21	0.767	0.767
TT20	3.63	1.12	0.745	0.857
TT21	3.45	1.21	0.648	0.978
TAs22	3.23	1.13	0.734	0.877
TAs23	3.45	1.23	0.745	0.867
TAs24	3.96	1.31	0.787	0.876
TAs25	3.55	1.22	0.756	0.818

The researcher prepared the final draft Self-constructed Research Tool, and there was distributed dimension after the process of the 'r' value. The theme has presented the Table 9.

Table 9

Distribution of Items under each dimension after item analysis

SL.NO	Constructs	No of Statements		
	(TPAS-TAP)	*Total*	*Positive*	*Negative*
1	Awareness (Code-A)	3	2	1
2	Breadth (Code-B)	3	2	1
3	Access and Equal Opportunities (Code-AEO)	6	4	2
4	Learning Outcome (Code-LO)	2	1	1
5	Quality Management (Code-QM)	4	3	1
6	Truthfulness (Code-T)	3	2	1
7	Assessment (Code-As)	4	2	2
	Total	**25**	**16**	**9**

Validity and Reliability Analysis for TPAS-TAP

As per the validity and reliability analysis (Table 10), each latent construct's Composite Reliability (CR) is more than the acceptable limit of 0.70.

Table10

Validity and Reliability Analysis

Construct	Composite Reliability (CR)	Average Variance Extracted (AVE)
A	0.811	0.567
B	0.845	0.651
AEO	0.724	0.533
LO	0.756	0.623
QM	0.702	0.589
T	0.819	0.745
As	0.745	0.651

Source: Data computed through IBM SPSS 28

The scale items reveal a strong internal consistency (Sekaran, 2016). On the other hand, the Average Variance Extracted (AVE) of each latent construct exceeds the threshold limit of 0.5. It affirms that the above-discussed CFA measurement model has strong convergent validity.

Exploratory Factor Analysis

Principal component analysis and varimax rotation were utilized in IBM SPSS 28 to conduct an exploratory factor analysis and determine the dimensions of teachers' perception and attitude scale. Factor analysis is a highly recommended technique in instrument development, having been used extensively to verify the dimension structure of numerous scale development research (Turker, 2009; Martnez et al., 2013; Fatma et al., 2014; El Akremi et al., 2015). To establish appropriate levels of explanation, the minimum factor loading requirement was set at 0.50 (Leech et al., 2005), and the degree of variance in each variable was evaluated through the commonality of the variables. The findings revealed that all commonalities were more than 0.60, indicating a high level of confidence in the results.

Table 11

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.834**
Bartlett's Test of Sphericity	**Approx. Chi-Square**	**3656.737**
	df	**308**
	Sig.	**.000**

Source: Data computed through IBM SPSS. 28

The result of factor analysis showed that Kaiser-Mayer-Olkin MSA was 0.834. The results showed a seven-factor solution with 69.024 variances explained by the items. The overall significance of the correlation matrix was tested using Bartlett's test (Table 11). The results showed that, collectively the correlations were significant. Results of Exploratory factor analysis regarding the Rotated TPAS-TAP Matrixa, statements, and loadings are summarised in Table 12.

Table 12

Rotated TPAS-TAP Matrixa

			Component		
	1	2	3	4	5
Awareness of policy is essential for the implementation of AEPD.	.615				
Teachers are aware of the NEP-2020 significant objectives of the policy.		.756			
Teachers are not aware of previous apprenticeship policies in India.		.705			
It helps to develop self-discipline among learners.			.745		
It develops the capacity and the production job of society.	.786				
It does not develop the overall motive of a learner.	.784				

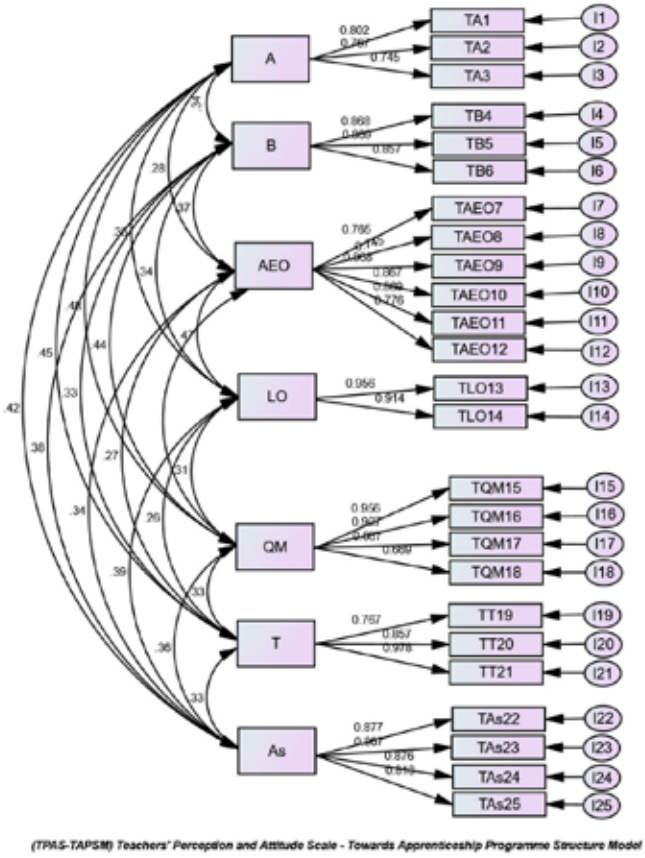
The location of Higher education institutions will depend on the implementation of AEDP.		.589			
An online Learning method that helps to meet its strategic goals towards AEDP.			.914		
It helps to select accessible career counselling.		.817			
A/I training enhances more soft skills for future learners.	.673				
It has not coordinated the entire infrastructure correctly during training.	.817				
It creates a hostile learning environment for all learners.		.665			
The institute has a tie-up with the companies for placements of the students.	.740				
Apprenticeship training may not produce outcome-based learners for socially accepted.				.766	
6-month A/I training fulfills the guideline of HEI/ UGC.		.694			
AEDP will provide A/I training in the last semester (6 semesters), its best strategy.			.890		
Motivate future learning to be career-oriented.		.683			
HEI does not require following all protocols given by UGC.	.774				
During the A/I degree program training, I need supervision for intern performance.					.650
Provide equal weightage for placement of every steam of learners.	.692				
It does not provide the same opportunities as other A/I technical degree courses.				.612	
AEDP will positively affect new graduate learners.		.735			
It helps to develop self-discipline among learners.			.790		
No need to upgrade the syllabus from time to time.	.747				
Does not provide Special infrastructure for exceptional learners.		.765			
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 13 iterations.					

Confirmatory Factor Analysis (CFA) for TPAS-TAP

Figure 3 indicates the " Teacher Perception and Attitude Scale- Toward Apprenticeship Programme Structure Model (TPAS-TAPSM) to aid in the understanding of verification parameters and the linkages between the selected items (Khan et al., 2021). The final 25-item responses were run for the CFA. The Rotated Component Matrix was copied to the IBM SPSS AMOS version 28 (Khan et al., 2021).

Figure 3

Teacher Perception and Attitude Scale- Toward Apprenticeship Programme Structure Model (TPAS-TAPSM)



Source: Created by the researcher using AMOS software

In the present study, the confirmatory Factor analysis determines whether seven components can be extracted from 25items: Awareness, Breadth, Access and Equal Opportunities, Learning Outcome, Quality Management, Truthfulness, and Assessment. The researchers developed the "TPAS-TAPSM" to help understand verification variables and the relationships between the chosen items. The aim was to understand better the relationship between dimension-wise items and the internal consistency of dimension-wise things shown in Figure 3, indicating that for this study, the teacher's perception and attitude have been shown by selecting different constructs for this tool and showing the consistency. Under Awareness (A) -TA1, TA2, TA3; Breadth (Code-B)- TB4, TB5, TB6; Access and Equal Opportunities (Code-AEO)-TAEO7, TAEO8, TAEO9, TAEO10, TAEO11, TAEO12; Learning Outcome (Code-LO)-TLO13, TLO14; Quality Management (Code-QM)-TQM15, TQM16, TQM17, TQM18; Truthfulness (T) -TT19, TT20, TT21; Assessment (Code-As)-TAs22, TAs23, TAs24, TAs25. The small circles with arrows indicated the serial number of this scale (I1 to I25). Medium rectangle too small rectangle arrow shows Cronbach's α of each item. So, the test indicates that this tool is fit for the study. Results of confirmatory factor analysis in terms of the factor name and loadings are summarized in Table 13.

Table 13

Factor Loadings

Factors	Indicator	Estimate	SE	Z	Cronbach's α	P
Awareness (A)	TA1	0.554	0.134	3.15	0.802	<.001
	TA2	1.163	0.123	3.11	0.767	<.001
	TA3	0.421	0.156	2.55	0.745	.009
Breadth (B)	TB4	0.956	0.167	8.90	0.868	<.001
	TB5	1.139	0.134	6.48	0.869	<.001
	TB6	0.956	0.156	4.33	0.857	<.001
Access and Equal Opportunities (AEO)	TAEO7	0.575	0.176	3.67	0.765	.002
	TAEO8	0.456	0.187	9.72	0.745	<.001
	TAEO9	1.1345	0.123	3.67	0.968	<.001
	TAEO10	0.967	0.134	3.65	0.867	<.001
	TAEO11	0.555	0.157	4.12	0.869	<.001
	TAEO12	1.167	0.164	2.56	0.776	<.011
Learning Outcome (LO)	TLO13	0.945	0.240	3.45	0.956	<.001
	TLO14	0.276	0.175	1.83	0.914	0.089
Quality Management (QM)	TQM15	0.556	0.167	3.67	0.956	<.001
	TQM6	1.145	0.120	9.52	0.907	<.001
	TQM17	0.674	0.145	3.57	0.867	<.001
	TQM18	1.135	0.145	2.88	0.669	<.001
Truthfulness (T)	TT19	0.433	0.134	2.35	0.767	0.019
	TT20	0.879	0.145	6.52	0.857	<.001
	TT21	0.554	0.156	4.32	0.978	<.001
Assessment (As)	TAs22	1.164	0.134	2.55	0.877	0.002
	TAs23	1.176	0.134	3.34	0.867	<.001
	TAs24	0.567	0.123	2.56	0.876	0.005
	TAs25	0.876	0.145	3.68	0.818	<.001

Source: Data computed through IBM SPSS. 28

The analytical summary for the model mentioned above, as produced by AMOS 28, is shown in Tables 13 and 14. The data are appropriate for the model fit, as shown by Table 14's Chi-square p-value of 0.132 (greater than 5%) and CMIN/DF value of 2.981 (less than 3). The model also produced additional goodness indices, including GFI = 0.923, AGFI = 0.803, CFI = 0.945, and NFI = 0.928, all of which are over their respective threshold limits and show that the model is well-fitted, and two indices of badness, including RMSEA = 0.040 (less than 0.10) and SRMR = 0.042 (less than 0.09), show that the data fits the model well because a lower RMSEA and as a result, it demonstrates the suitability of the mentioned CFA measurement approach.

Table 14

Summary of CFA Model Fit

Name of Category	Model Fit Indices	Threshold Limits	Value Attained
Absolute fit Indices	X2	p-value > 0.05	0.132
	RMSEA	>0.10 bad fit; 0.05-0.10 mediocre fit; and if <0.05 good fit	0.040
	SRMR	<0.09	0.042
	GFI	<0.90	0.923
Incremental Fit Indices	AGFI	>0.80	0.803
	CFI	>0.80 sometimes permissible; >0.90 traditional; and if >0.95 great	0.945
	TLI	>0.90	0.901
	NFI	>0.90	0.928
Parsimonious Fit	CMIN/ DF	<3 good; and if <5 sometimes permissible	2.981

Source: Data computed through IBM SPSS AMOS 28

Given that their p-values are less than 5%, Table 10 shows that all manifest variables connected to the corresponding latent construct shown in Figure 3 are statistically significant. Furthermore, it goes on to say that because each measured variable, manifest variable, or observed variable has a strong correlation with its corresponding theoretical construct and has a standardised regression weight of at least 0.40, the convergence validity of the CFA measurement model is also attained (Abbott, 2003).

Norms

The researchers confidently provided clear guidelines to the entire group and effectively utilized the "TPAS-TAP" tool, which provides scores ranging from 25 to 125. Scores between 40 and 60 percent indicate a neutral stance towards ADEP, while scores above 60 percent reflect a positive attitude and perception towards AEDP. Conversely, scores below 40 percent suggest negative attitudes and perceptions towards ADEP, and based on these criteria, the samples were confidently divided into one (teacher) distinct group.

Conclusion and Implications

This paper analysed the validation of the scale development procedure. Teachers' Perception and Attitude Scale-towards Apprenticeship Programme (TPAS-TAP) presents a rigorous process successively has been filled to develop and test perceptions and attitudes towards AEDP. The model is validated with statistical tools. Each latent construct is well described before creating the measurement model for the constructs. The result indicates that the internal consistency is good; overall, Cronbach's alpha reliability was 0.856. The confirmatory factor analysis employed the structural equation model and goodness of fit index (CMIN/DF= 2.981) to analyse and study the relationship between components. The RMSEA was 0.040; IBM SPSS (28) AMOS software was used to analyse the scale,suggesting a good measurement model and path analysis informs that the scale showed good evidence of both convergent and factorial validity; path coefficients provide the degree of impact on the dependent constructs. These guidelines will also be helpful to other researchers who wish to perform research. It teaches

how to make tools and their importance in future studies. Academicians, professors, research supervisors, policymakers, etc., can use this instrument better to understand instructors' attitudes and perspectives on research. This tool will assist teachers/ stakeholders in identifying the gaps in the present AEDP programme on the quality of training, awareness, breadth, assessment, learning outcomes, quality management, truthfulness, and assessment perspective in the Indian context. The present databased paper offers implications for academicians. For instance, the data indicates that administrators' perception of awareness, access, equal opportunities, learning outcomes, and breadth can, directly and indirectly, influence the effectiveness of the apprenticeship degree programme. On the other hand, the attitude of quality management, truthfulness, and assessment positively affect AEDP in the Indian context. Through this scale development process, researchers can understand the relationship between awareness and learning outcome, quality management and assessment, learning outcome, the truthfulness of AEDP and the significant relation on quality management. Here, different dimension items measure the effectiveness of implementing AEDP. This study can help researchers, academics, and policymakers understand how the perspective and attitude of administrators as a stakeholder can be influenced and what different dimensions/ Constructs can be used to know how to oversee the new apprenticeship-embedded degree programme introduced by UGC.

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