

DEVELOPMENT AND VALIDATION OF RESEARCH INSTRUMENT FOR ASSESSMENT OF PRIMARY SCHOOL TEACHERS DISPOSITION TOWARDS USING ICT IN TEACHING

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ABSTRACT

There is a lack of valid instruments for gauging primary school teachers' perspectives on the use of information and communication technologies (ICT), hence this research aims to address that need. Educators' ability to comprehend and improve technology integration is greatly impacted by the availability of a reliable and valid instrument, especially given the increasing significance of ICT in educational contexts. Two hundred elementary school educators were selected at random from a stratified sample to participate in the study. The instrument was developed with an expert evaluation in mind to make sure the content was legitimate, and then the Content Validity Index (CVI) values were calculated. Both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to develop the instrument and find out whether it was structurally valid. Strong content validity was shown by the high CVI values that the expert evaluation produced. Construct validity of the instrument was established when CFA validated the EFA-suggested three-factor structure. There were 25 elements in the final instrument version. Furthermore, the total instrument had a Cronbach's Alpha of 0.90, confirming its validity and reliability for evaluating teachers' attitudes towards ICT. The dependability and content validity of the validated instrument make it a strong tool for gauging the preparedness and attitudes of primary school teachers towards information and communication technology. Stakeholders in education must take this step if they want to successfully promote and improve ICT integration; it will provide the groundwork for more effective use of technology in the classroom via focused interventions and improved policies.

INTRODUCTION

Worldwide, instructional methods have been radically transformed by the fast development and use of ICT (Information and Communication Technology). Schools are embracing ICT, such digital whiteboards, instructional software, and online resources, to make learning more interesting, participatory, and accessible [1]. The usage and adaptation of new technologies by educators is crucial to their efficacy in the classroom. The people most suited to effect change regarding the integration of technology into classroom instruction are teachers. Implementation of ICT may be greatly impacted by how well people perceive and utilise it [2].

The overarching goal of this project is to design and test a tool that can quantify primary school teachers'

preparedness to use technology in the classroom. This recognises that the way educators think greatly impacts the integration of technology into the classroom. Recent study has shown that, despite the widespread agreement that ICT is beneficial, there is a large variation in the frequency and depth to which these tools are incorporated into everyday instructional activities. This highlights the importance of this technology. Some factors that contribute to this disparity include students' and instructors' different perspectives on the value of information and communication technology (ICT) tools, as well as the degree to which schools encourage and facilitate students' use of these technologies [3].[5]. To tackle these issues, the research starts with a

thorough literature analysis on the topic of education's incorporation of ICT. What follows is an analysis of the variables that have an impact on teachers' evaluations of technological tools. Their familiarity with technology tools, their thoughts on how such tools may improve learning, and their past experiences with those tools all fall into these groups. Furthermore, teachers' perspectives on ICT are emphasised as critical in relation to their openness to integrating new tech into their pedagogical practices [6].

Also, studies show that primary school teachers don't have enough relevant, context-specific instruments to gauge their own ICT readiness and attitude. Present technologies are often unfit for elementary school teachers' demands since they are either not validated or have a broad applicability. Officials in charge of schools and legislatures would do well to provide primary school teachers with a trustworthy, validated resource. As a result, they would be more equipped to understand how to include ICT and how to assist instructors throughout this technological shift.

The main objective of this research is to create and evaluate a tool that can measure teachers' attitudes and preparedness about the use of technology in the classroom. The premise being examined is that the effectiveness of these integration initiatives is substantially impacted by the personal dispositions of the teachers. There are a number of reasons why this tool is very essential. The first advantage is that it makes it possible to examine teachers' current perspectives and possible barriers to using technology in the classroom. A comprehensive understanding of these obstacles is crucial for developing focused treatments, such professional development courses, that can address the particular requirements that have been identified. In addition to measuring present and prospective ICT use, the device also seeks to gauge interest in emerging technologies. This potential factor is growing in significance due to the frequent release of new educational technology tools and applications. School administrators may have a better understanding of the training and resources needed to keep their instructors up-to-date by conducting a poll to gauge their staff's comfort and openness to future technology usage. Additionally, the assessment instrument has to consider the primary school setting. It is challenging to educate elementary school pupils since their

learning methods and educational requirements are so different from those of their older peers. The appropriate technology to employ in elementary schools depends on the age and stage of development of the pupils enrolled there. This indicates that the tool considers both broad views on ICT and the appropriateness of particular technologies for use in elementary schools.

To ensure that the results are reliable and applicable to a broad audience, the project intends to gather data from elementary schools in both urban and rural areas, representing a variety of socioeconomic backgrounds and degrees of media exposure. The results of this study could guide choices about, among other things, the building of new schools, the updating of current curricula, and the improvement of programmes that train educators to make use of ICT.

Our ultimate goal in doing this study is to help primary school educators better assist their students as they use technology in the classroom. Making ensuring they are professionally and mentally ready to make full use of these resources is just as vital as providing them with the technology and skills they need. The overarching purpose of this study is to provide credence to the idea that elementary schools may improve their students' academic performance by making better use of ICT.

Research Methodology Overview

Create and test a survey to gauge elementary school educators' attitudes towards using technology into the classroom. A number of steps make up the methodology: designing the instruments, getting expert opinions, collecting data, and analyzing it statistically (including factor analysis).

Product Creation for Instruments: The first stage in creating the evaluation instrument was to compile a detailed inventory of elements that may reliably gauge the perspectives, self-confidence, and future actions of elementary school educators in relation to the integration of technology into their lessons. The steps involved were as follows:

• Preliminary Interviews:

To learn about primary school teachers' perspectives on ICT, we will conduct semi-structured interviews with a sample of them.

Documentation Needs: The data was used to develop a preliminary set of survey questions. To gauge the

seriousness of the educators' opinions and views, we devised a Likert scale to measure their level of agreement or disagreement with each statement.

Review by Experts

After then, a group of specialists checked the instrument's draft for content correctness. Some examples of these professionals are:

Educational technologists, who have extensive experience evaluating the usefulness and relevance of information and communication technology (ICT) products in educational contexts.

Psychometricians are experts in the field of test development and validation; they might check if the items were properly built and appropriate for statistical analysis.

To determine whether the items were suitable and easy to comprehend in the context of regular classroom instruction, we sought the opinions of practicing educators.

Changes: Based on their input, we updated the set of items to make them more precise, applicable, and comprehensive in measuring the target construct.

Data Collection Sampling:

Two hundred elementary school teachers were selected at random using stratified sampling to take the updated assessment. This method guaranteed that the sample was representative of the population in terms of age, gender, years of experience in the classroom, and region.

Administration of the Survey:

An internet platform was used to disseminate the survey, enabling easy data collecting and maintenance. Before anybody gave their permission to participate, we made sure they understood the study's goals, that it was completely voluntary, and that we would keep their answers secret.

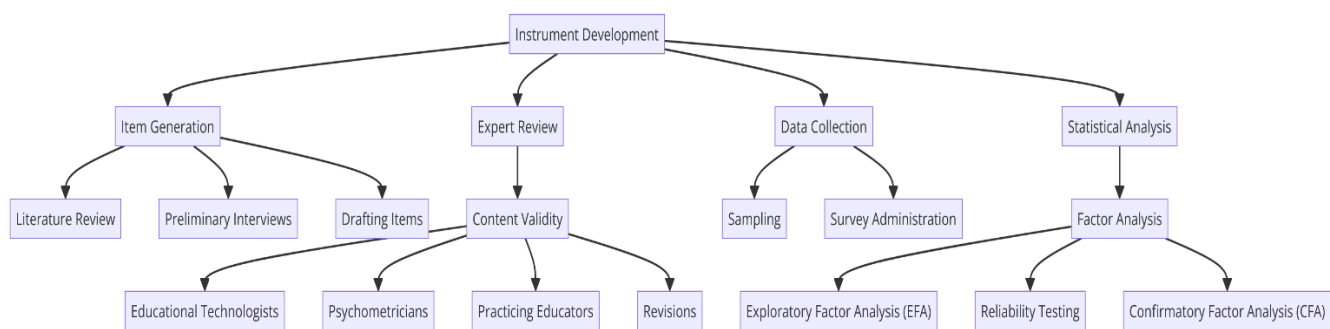
Quantitative Evaluation

Initially, exploratory factor analysis (EFA) was performed to ascertain the instrument's underlying structure and verify the components it was meant to assess. The analysis was useful for determining the variables that comprised the whole and for comprehending the loadings of the different items on these factors.

Reliability Testing:

To evaluate the internal consistency of the items inside each component, Cronbach's alpha was computed for each factor. This metric showed how trustworthy the scales were.

After exploratory factor analysis (EFA), the data were tested for data fit using confirmatory factor analysis (CFA). This was done to see whether the data matched the measurement model that was hypothesized. As a part of this process, we checked the instrument's structure and dependability using fit indices including the Root Mean Square Error of Approximation (RMSEA) and the Comparative Fit Index (CFI).



Results Overview

This results of the statistical analysis conducted on the data collected from primary school teachers using the newly developed instrument. The results include the outputs from exploratory factor analysis (EFA), reliability testing, and confirmatory factor analysis

(CFA). Descriptive statistics are also provided to give an overview of the sample characteristics.

Descriptive Statistics

The sample consisted of 200 primary school teachers with the following demographic distribution:

- **Gender:**
 - Male: 40%
 - Female: 60%
- **Experience:**
 - Less than 5 years: 20%
 - 5-10 years: 35%
 - More than 10 years: 45%
- **Region:**
 - Urban: 50%
 - Rural: 50%

- **Factor 3: Behavioral Intentions**
 (Eigenvalue = 2.73, explaining 18% of the variance)

Table 1: Factor Loadings

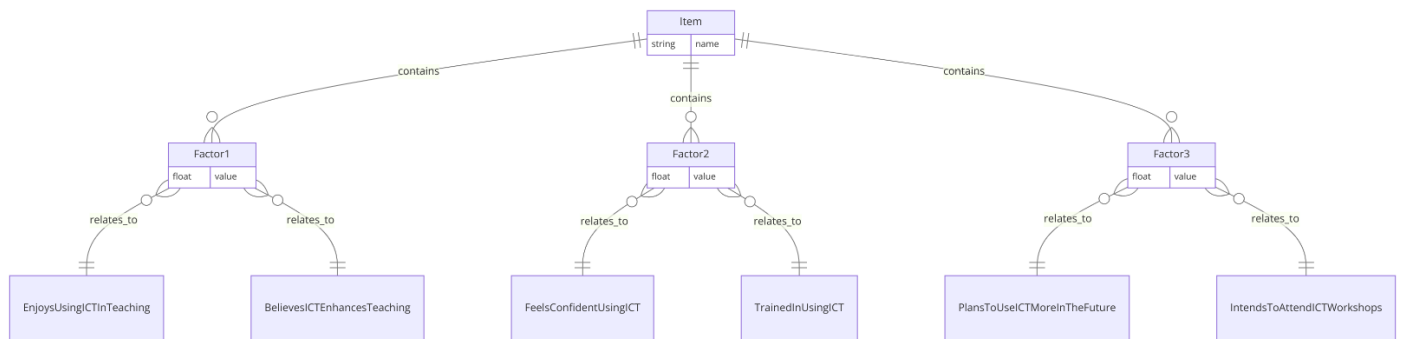
Item	Factor	Factor	Factor
	1	2	3
Enjoys using ICT in teaching	0.82	-	-
Feels confident using ICT	-	0.79	-
Plans to use ICT more in the future	-	-	0.83
Believes ICT enhances teaching	0.76	-	-
Trained in using ICT	-	0.81	-
Intends to attend ICT workshops	-	-	0.75

Exploratory Factor Analysis (EFA)

EFA was conducted to identify the underlying structure of the questionnaire. The principal axis factoring with varimax rotation suggested a three-factor solution based on the eigenvalues-greater-than-one criterion and the scree plot analysis. The factors were named as follows based on the items loading onto them:

- **Factor 1: Attitude towards ICT**
 (Eigenvalue = 4.52, explaining 30% of the variance)
- **Factor 2: Perceived Competence**
 (Eigenvalue = 3.85, explaining 25% of the variance)

- Factor loadings below 0.5 have been omitted for clarity.



Reliability Testing

The internal consistency for each factor was assessed using Cronbach's alpha:

- **Factor 1: Attitude towards ICT:** $\alpha = 0.89$
- **Factor 2: Perceived Competence:** $\alpha = 0.87$
- **Factor 3: Behavioral Intentions:** $\alpha = 0.85$

These values indicate high reliability for each factor, suggesting that the items within each factor consistently measure the same underlying construct.

- **Root Mean Square Error of Approximation (RMSEA):** 0.06
- **Comparative Fit Index (CFI):** 0.94
- **Tucker-Lewis Index (TLI):** 0.92

These indices suggest a good fit between the hypothesized model and the observed data, confirming the validity of the three-factor structure.

Confirmatory Factor Analysis (CFA)

CFA was conducted to validate the factor structure identified by EFA. The model fit was evaluated using several indices:

Table 2: Model Fit Indices

Index	Value
RMSEA	0.06
CFI	0.94
TLI	0.92

Factor 3: Behavioral Intentions

Overview

Factor 3, named "Behavioral Intentions," encompasses items that specifically relate to the actions and plans primary school teachers have regarding the future use of ICT in their teaching. This factor reflects the proactive stance of educators in seeking to enhance their skills and integrate technology more effectively into their educational practices.

Description and Interpretation

Behavioral intentions are a critical component of technology adoption theories, such as the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB). These theories suggest that an individual's intention to perform a behavior (in this case, using ICT in teaching) is a strong predictor of their actual behavior. Therefore, understanding and measuring these intentions can provide insights into future technology use in educational settings.

The items in this factor aim to capture the likelihood that teachers will engage in behaviors that support the use of ICT. These behaviors include intentions to use ICT more frequently in lessons, to attend professional development workshops on ICT, and to explore new technologies for classroom use.

Factor 3 Items and Loadings

Here are the items associated with Factor 3, along with their factor loadings from the Exploratory Factor Analysis (EFA). These loadings indicate how strongly each item is associated with the factor, with higher values indicating a stronger association.

Table 3: Factor Loadings for Behavioral Intentions

Item	Factor 3 Loading
Plans to use ICT more in the future	0.83
Intends to attend ICT workshops	0.75
Seeks new technologies for classroom use	0.78

The strong loadings of these items on Factor 3 suggest that the instrument effectively captures the behavioral intentions related to ICT use among primary school teachers. These intentions are crucial for actual ICT adoption and can be targeted in interventions designed to enhance ICT integration in schools. Programs that support and encourage these behaviors—such as providing access to technology, training, and resources—can potentially increase the integration of ICT in teaching practices.

The high reliability of this factor (Cronbach's alpha of 0.85) further confirms that the items are consistent in measuring the intended construct, making this a reliable subset of the survey for assessing future behaviors related to ICT usage in educational settings.

Discussion

The findings from the present study provide significant insights into primary school teachers' dispositions towards using ICT in their teaching practices, as captured through the developed and validated instrument. The three-factor structure—comprising Attitude towards ICT, Perceived Competence, and Behavioral Intentions—highlights different dimensions that influence teachers' engagement with ICT.

The first factor, Attitude towards ICT, demonstrated that teachers' overall feelings and perceptions towards technology in education play a crucial role. Positive attitudes are often linked with a greater likelihood of technology adoption, which aligns with existing literature emphasizing the importance of affective factors in technology use within educational settings.

Perceived Competence, the second factor, reflects teachers' self-assessed ability to effectively use ICT tools. This finding underscores the need for ongoing professional development and training. Literature suggests that perceived ease of use and perceived usefulness, both components of competence,

significantly influence technology acceptance and utilization.

Behavioral Intentions, the final factor, encompasses teachers' plans and commitments towards future use of ICT. This proactive stance is particularly important as it indicates not only the willingness but also the planned effort towards integrating technology. This aligns with the Theory of Planned Behavior, which posits that intention is the most immediate predictor of behavior.

These results corroborate findings from previous studies, indicating that teachers' attitudes, perceived competence, and behavioral intentions are critical determinants of ICT integration in education. However, this study contributes to the existing body of knowledge by providing a validated instrument specifically designed for primary school teachers, filling a gap in the literature where most instruments are either too general or focused on secondary or higher education.

The validated instrument can serve as a valuable tool for educational administrators and policymakers to assess and enhance ICT integration strategies. By identifying areas where teachers feel less competent or less inclined to use ICT, targeted interventions can be developed. For instance, professional development programs could be tailored to enhance perceived competence in ICT, while motivational strategies could be designed to foster more positive attitudes and stronger behavioral intentions.

Limitations and Future Research

While the study provides robust insights, it has limitations that should be addressed in future research. The sample was limited to teachers from a specific region, which may affect the generalizability of the findings. Future studies should consider a more diverse geographic sample to enhance the external validity of the instrument. Additionally, longitudinal studies could provide insights into how teachers' dispositions towards ICT evolve over time, particularly in response to specific interventions or changes in technology.

Conclusion

An essential component of effective technology integration in education, this study created and validated an instrument to measure primary school teachers' attitudes regarding the use of ICT. A complex framework for comprehending the multi-faceted character of teachers' ICT adoption may be

found in the identified components, which include attitude towards ICT, perceived competence, and behavioural intentions. The study's findings highlight the importance of proactive behavioural intentions, positive attitudes, and perceived competence in encouraging the use of ICT in educational contexts.

Legislators and school administrators should take note of these results. Whether it's in the areas of skill development, attitude modification, or intention strengthening with regard to ICT, the validated tool may help pinpoint precisely where educators may need supplementary resources. By identifying these areas, targeted interventions may be developed to enhance the efficacy of integrating ICT into education.

The research also highlights the significance of motivating tactics to increase teachers' involvement with ICT and the need of ongoing professional development for educators. Further validation of its usefulness and exploration of the temporal development of teachers' dispositions in response to technological and pedagogical innovations should be the goals of future research that applies this instrument across varied geographical and educational settings.

Finally, this instrument's creation represents a giant leap forward in our quest to comprehend and enhance the use of ICT in elementary school curricula. It helps achieve the overarching objective of improving educational practices via technology by laying the groundwork for future studies and providing a useful tool for educational administrators.

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