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Enhancing Sociology Students' Research Instrument Development Skills through Digital Platform-Based Training at Halu Oleo University

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ABSTRACT

Students often experience difficulties in developing research instruments, particularly in formulating variables, constructing indicators, designing questionnaire items, and aligning instruments with research problems. This community service program aimed to improve students' competence in developing research instruments through structured online platform-based training. The program was conducted from November to December 2025 at the Department of Sociology, Faculty of Social and Political Sciences, Halu Oleo University, involving 94 students. The activity was implemented through preliminary needs assessment, preparation of training materials, presentations, demonstrations, guided practice, group discussions, feedback sessions, and evaluation. Students were introduced to the principles of research instrument development, including variable formulation, indicator construction, questionnaire design, validity and reliability concepts, and the use of digital platforms such as Google Forms and Microsoft Forms. The results showed notable improvement in students' competencies. Students' basic understanding of research instrument development increased from 38 students (40.4%) before the training to 80 students (85.1%) after the training. Their understanding of fundamental methodological principles improved from 42 students (44.7%) to 75 students (79.8%), while their ability to align research instruments with research problem formulation increased from 33 students (35.1%) to 71 students (75.5%). These findings indicate that online platform-based training contributed positively to strengthening students' methodological competence and digital literacy in developing research instruments.

Keywords: Digital Platform; Online Research Instrument; Research Methodology; Student Training; Sociology Students.

INTRODUCTION

The development of research instruments is a fundamental competency that must be mastered by university students, particularly those in the field of sociology. Research instruments function as essential tools for collecting data systematically, and the quality of these instruments directly influences the validity, reliability, and credibility of research findings (Syaddiyah & Ardi, 2025; Daryanes et al., 2025). In research methodology, validity refers to the extent to which an instrument accurately measures the intended construct, while reliability refers to the consistency of measurement results across different situations and periods. Therefore, the ability to design valid and reliable research instruments is an important requirement for producing scientifically accountable research. Previous studies also emphasize that the development of research instruments should be conducted carefully to ensure that the items are clear, measurable, and methodologically appropriate (Raden Ismail et al., 2023; Kalkbrenner, 2021).

Ideally, students should be able to develop research instruments systematically by aligning research objectives, variables, indicators, and measurement items while also applying appropriate validation and reliability procedures (Kalkbrenner, 2021). Research instruments should undergo rigorous processes such as expert judgment, construct validation, and reliability testing to ensure methodological quality (Pérez-Montesdeoca et al., 2026). In addition, instrument construction requires a clear connection between theoretical concepts and operational indicators so that the resulting items can accurately represent the variables being studied (Blegur et al., 2025). This process is especially important in sociology, where

many research topics involve abstract social concepts that must be translated into measurable indicators and well-structured instrument items.

However, the actual condition among students in the Department of Sociology, Faculty of Social and Political Sciences, Halu Oleo University, indicates that many students still experience difficulties in developing proper research instruments. Based on preliminary observations and pre-training assessment conducted before the program, students commonly faced challenges in identifying appropriate research variables, formulating measurable indicators, constructing questionnaire items systematically, and understanding the principles of validity and reliability. The initial assessment showed that only 38 students (40.4%) demonstrated basic understanding of research instrument development, 42 students (44.7%) understood fundamental methodological principles, and 33 students (35.1%) were able to align research instruments with research problem formulation. In addition, many students had limited experience in using digital platforms such as Google Forms and Microsoft Forms to develop online research instruments. These limitations caused the instrument development process to become less systematic and less aligned with methodological standards.

Several previous studies also report that novice researchers frequently encounter difficulties in operationalizing theoretical concepts into measurable variables and indicators (Daryanes et al., 2025). At the same time, the integration of digital technology into research instrument development has become increasingly important because digital platforms can improve efficiency, accessibility, and flexibility in the data collection process (Alfian et al., 2025; Pergantis et al., 2025). Although digital learning technologies have become increasingly available in higher education, their implementation in methodological training activities remains limited due to low digital literacy, lack of practical training, and insufficient guidance in utilizing technology-based research tools (De Oliveira et al., 2025; Soulthoni et al., 2025). As a result, many students still rely on conventional approaches in instrument development without fully understanding how methodological principles can be integrated with digital research tools.

This condition demonstrates a competency gap between the methodological skills expected of sociology students and their actual capacity to develop online research instruments independently. Most existing learning activities tend to focus primarily on theoretical understanding, while practical and technology-assisted training opportunities remain limited. Therefore, a more practical and structured training approach is needed to combine methodological understanding with hands-on experience in using online platforms for research instrument development. This community service activity was designed to address these challenges by providing practical training on developing online research instruments for sociology students at Halu Oleo University. The program focused on strengthening students' understanding of research instrument design, improving their ability to formulate variables and indicators, and enhancing their skills in utilizing digital platforms for online data collection. Through this activity, students were expected to develop more systematic, practical, and methodologically appropriate research instruments while also improving their digital literacy in contemporary research practices.

METHOD

This community service program was conducted from November to December 2025 at the Department of Sociology, Faculty of Social and Political Sciences, Halu Oleo University. The program involved 94 students who participated in training on online research instrument development. The activity was designed to strengthen students' methodological

understanding and practical skills in developing research instruments by integrating conceptual explanation, guided practice, and the use of digital platforms.

The program was implemented through several stages. The first stage was a preliminary needs assessment, which was carried out through observations and short diagnostic assessments to identify students' initial understanding of research instrument development. This stage focused on examining students' basic knowledge of research variables, indicators, questionnaire construction, and the principles of validity and reliability. The results of this initial assessment served as the basis for preparing the training materials and determining the focus of the practical sessions.

The second stage involved the preparation of training materials and learning resources. The materials covered key topics related to research instrument design, including the formulation of variables and indicators, construction of questionnaire items, basic concepts of validity and reliability, and the use of online platforms such as Google Forms and Microsoft Forms. These materials were prepared to help students understand not only the theoretical aspects of instrument development but also the practical procedures for creating online research instruments.

The third stage was the implementation of the training activities. The training was conducted through presentations, demonstrations, guided practice sessions, group discussions, and question-and-answer activities. During the practical sessions, students were guided to develop research instruments based on their proposed research topics. The facilitators provided direct assistance and feedback on several aspects of instrument development, including the clarity of items, appropriateness of indicators, alignment between instruments and research objectives, and technical arrangement of online instruments.

The final stage was evaluation. To assess students' competencies, pre-training and post-training assessments were conducted using observation sheets and evaluation rubrics developed by the service team. The assessment focused on three competency indicators: (1) students' understanding of research instrument development, (2) students' understanding of methodological principles, including clarity, relevance, and alignment with research objectives, and (3) students' ability to align research instruments with research problem formulation. The data obtained from the assessments were analyzed descriptively by comparing the percentage of students' competency achievement before and after the training.

RESULT

The community service program was implemented after a preliminary survey and coordination with the Heads of the Social Welfare, Political Science, and Sociology Study Programs at the Faculty of Social and Political Sciences, Halu Oleo University, on 8 November 2025. Following this coordination, 94 students from the Department of Sociology were invited to participate in the training program, along with lecturers and instructors with expertise in research methodology and instrument development. The main training activity was held on 26 November 2025 at Bahtiar Hall, FISIP UHO, under the theme "Enhancing Students' Capacity in Developing Research Instruments through Online Platforms."

Figure 1. Community Service: Training on Online Research Instrument

The training was supported by prepared learning materials, including methodological modules, guidelines for constructing instrument grids and items, and sample research instruments. In addition, practical scenarios for developing online research instruments were provided to help students apply methodological concepts directly using digital platforms such as Google Forms and Microsoft Forms. The activity was also supported by adequate facilities, including laptops, internet access, online survey applications, digital attendance systems, and documentation tools.

The program was carried out through three main activity stages. The first stage was the introduction to online research instruments. In this stage, participants were introduced to the basic concepts of research instruments, types of instruments, principles of instrument development, formulation of variables and indicators, construction of instrument grids, and development of question or statement items. The importance of validity and reliability was also emphasized to help students understand the methodological standards required in research instrument development.

The second stage was practical training in online research instrument development. During this stage, students practiced developing questionnaires, interview guides, or observation sheets based on their proposed research topics. They were guided to formulate variables, determine indicators, construct instrument grids, develop items, and select appropriate measurement scales. Students also practiced using online platforms such as Google Forms and Microsoft Forms to develop digital research instruments. Facilitators provided direct feedback on item clarity, indicator relevance, scale appropriateness, and the alignment between instrument items and research objectives.

The third stage focused on problem-solving in online instrument development. In this stage, students were guided to identify and revise common weaknesses in their instruments, such as unclear indicators, ambiguous wording, inappropriate item construction, and weak alignment between research problems and instrument items. Through discussion and feedback sessions, students were able to refine their instruments and improve their understanding of how to develop more systematic and methodologically appropriate research instruments.

The results of the pre-training and post-training assessments showed notable improvement in students' competencies. The improvement was measured using observation

sheets and evaluation rubrics developed by the service team. The assessment focused on three competency areas: basic understanding of research instrument development, understanding of fundamental methodological principles, and ability to align research instruments with research problem formulation.

Table 1. Pre- and Post-Training Comparison of Students' Competencies in Research Instrument Development

No.	Competency Area	Before Training, n (%)	After Training, n (%)	Improvement
1	Basic understanding of research instrument development	38 students (40.4%)	80 students (85.1%)	+42 students (+44.7 percentage points)
2	Understanding of fundamental principles	42 students (44.7%)	75 students (79.8%)	+33 students (+35.1 percentage points)
3	Alignment between instruments and research problem formulation	33 students (35.1%)	71 students (75.5%)	+38 students (+40.4 percentage points)

As shown in Table 1, students' basic understanding of research instrument development increased from 38 students (40.4%) before the training to 80 students (85.1%) after the training. This indicates that more students were able to understand the basic process of developing research instruments, particularly in formulating items based on research variables.

Students' understanding of fundamental methodological principles also improved. Before the training, 42 students (44.7%) demonstrated understanding of principles such as clarity, relevance, and alignment with research objectives. After the training, this number increased to 75 students (79.8%). This improvement suggests that the training helped students develop better awareness of the methodological quality required in constructing research instruments.

The ability to align research instruments with research problem formulation also showed improvement. Before the training, 33 students (35.1%) were able to demonstrate this competency. After the training, the number increased to 71 students (75.5%). This result indicates that the guided practice and feedback sessions helped students better connect research problems, variables, indicators, and instrument items.

Overall, the results indicate that the online platform-based training contributed positively to students' methodological understanding and practical skills in developing research instruments. The use of digital platforms such as Google Forms and Microsoft Forms also helped students become more familiar with online instrument preparation, digital questionnaire design, and online data collection procedures. These findings show that structured training, guided practice, and direct feedback can support the development of students' competencies in preparing research instruments more systematically and effectively.

DISCUSSION

The findings of this community service program indicate that the training activities contributed positively to improving students' competencies in developing online research instruments. The improvement can be observed in several competency areas, including students' understanding of research instrument development, comprehension of methodological principles, and alignment between research instruments and research

problems. Before the training, many students experienced difficulties in translating research variables into measurable indicators and constructing appropriate instrument items. After participating in the training and practical sessions, students demonstrated better understanding and greater confidence in developing research instruments systematically.

The increase in students' competencies is closely related to the practice-oriented learning approach implemented during the program. The training combined theoretical explanation, direct demonstrations, guided practice, discussions, and feedback sessions. This approach allowed students not only to understand methodological concepts theoretically but also to apply them directly in developing questionnaires, interview guides, and observation sheets using digital platforms such as Google Forms and Microsoft Forms. The practical activities helped students connect abstract methodological concepts with actual research practices.

The findings of this activity are consistent with previous studies emphasizing the importance of experiential and active learning approaches in higher education. Lombardi et al. (2021) and Theobald et al. (2020) reported that active learning strategies improve students' conceptual understanding and practical competencies more effectively than conventional lecture-based approaches. Similarly, Kavitha Devi & Thendral (2023) explained that experiential learning activities encourage deeper understanding because students actively participate in the learning process through practice and reflection. In this program, students were directly involved in developing research instruments and receiving feedback, which supported the improvement of their methodological understanding.

In addition, the improvement in students' ability to align research instruments with research objectives reflects the importance of constructive alignment in instructional activities. Students were trained to connect research problems, variables, indicators, and instrument items systematically. This finding supports the study by Jean et al. (2022), which stated that learning activities become more effective when instructional objectives, learning activities, and assessment processes are aligned coherently. Through guided practice and mentoring, students became more capable of developing research instruments that were relevant to their research focus.

The use of digital platforms also played an important role in enhancing students' learning experiences. Prior to the training, many students had limited experience in utilizing online tools for instrument development. Through hands-on activities, students learned how to design online questionnaires, manage item structures, organize response settings, and improve the clarity of questions in digital forms. These findings support previous research showing that technology-assisted learning environments can improve students' digital competencies and increase engagement in learning activities (Bond et al., 2021; Falloon, 2020). The integration of digital platforms in this activity helped students understand that research methodology and digital literacy are interconnected competencies in contemporary academic research.

From a practical perspective, this program provides several important implications. For students, the training helped strengthen methodological competence and increased confidence in preparing research instruments for academic research projects, proposals, and theses. For lecturers, the activity demonstrates the importance of combining theoretical explanation with practical training and continuous feedback in teaching research methodology courses. Meanwhile, for higher education institutions, the program highlights the need to integrate digital research skills more systematically into methodological learning activities to better prepare students for modern research environments.

Despite these positive outcomes, several limitations were identified during the implementation of the activity. Some students still experienced difficulties in formulating indicators and constructing valid instrument items independently, indicating that research instrument development remains a complex skill that requires continuous practice. This condition may be influenced by the relatively short duration of the training, differences in students' initial methodological knowledge, limited prior experience in developing research instruments, and the absence of structured follow-up mentoring after the program. Since developing research instruments requires the ability to translate research problems into variables, indicators, and measurable items, some students may need additional guidance and repeated practice to achieve stronger independent competence. In addition, the evaluation conducted in this program primarily used descriptive assessment and participant feedback without applying statistical testing to measure the significance of competency improvement. Therefore, the improvement observed in this program is more appropriately described as a substantial or notable improvement rather than a statistically significant improvement.

Taken together, these findings suggest that structured and practice-based training activities can support the development of students' competencies in research instrument development. The combination of methodological guidance, direct practice, feedback sessions, and digital platform utilization contributed to students' improved understanding and practical skills. These findings also indicate that similar training programs may be implemented more broadly in research methodology learning activities to strengthen students' methodological and digital competencies in higher education.

CONCLUSION

This community service program aimed to improve sociology students' competence in developing research instruments through structured online platform-based training. The program addressed students' difficulties in formulating indicators, constructing instrument items, and aligning research instruments with research objectives and variables. By integrating methodological guidance, hands-on practice, guided feedback, and digital platforms such as Google Forms and Microsoft Forms, the program provided students with practical experience in developing more systematic and applicable online research instruments. The results showed notable improvement in students' competencies, with students' basic understanding of research instrument development increasing from 40% to 85%, understanding of fundamental principles improving from 45% to 80%, and ability to align research instruments with research problem formulations increasing from 35% to 75%.

These findings indicate that online platform-based training contributed positively to strengthening students' methodological competence and digital literacy in research instrument development. The program also implies that practice-oriented training supported by continuous feedback and digital tools can be used as an effective strategy in research methodology learning. However, this program was limited by its relatively short implementation period, its focus on students from one department, and the use of descriptive measurements without statistical testing. Therefore, future programs should include longer mentoring, repeated practice opportunities, and follow-up evaluation to support more sustainable improvement in students' ability to develop valid and reliable research instruments independently.

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