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Implementation of the *Auditory, Intellectually, Repetition* (AIR) Learning Model Assisted by the *Quizlet* Application to Improve Student Learning Outcomes in Sociology in Grade XII Social Sciences 3 at SMAN 4 Mataram

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Abstrak : Rendahnya hasil belajar kognitif masih menjadi permasalahan dalam pembelajaran sosiologi di jenjang SMA. Studi pendahuluan di kelas XII Ilmu Sosial 3 SMA Negeri 4 Mataram menunjukkan bahwa 23 dari 34 siswa (68%) belum mencapai ketuntasan pada ujian tengah semester. Penelitian ini bertujuan untuk meningkatkan hasil belajar kognitif siswa melalui penerapan model pembelajaran Auditory, Intellectually, Repetition (AIR) berbantuan aplikasi Quizlet. Penelitian ini merupakan Penelitian Tindakan Kelas yang dilaksanakan dalam dua siklus dengan dua pertemuan pada setiap siklus, melibatkan 34 siswa dan guru sosiologi kelas tersebut. Data dikumpulkan melalui observasi aktivitas guru (22 butir), tes pilihan ganda 25 butir berdasarkan Taksonomi SOLO, dan dokumentasi, kemudian dianalisis secara deskriptif dengan model Miles dan Huberman. Keterlaksanaan langkah pembelajaran meningkat dari 77% pada siklus I menjadi 95% pada siklus II, ketuntasan belajar naik dari 68% menjadi 79%, dan nilai rata-rata kelas naik dari 68 menjadi 75, sehingga kedua indikator keberhasilan tercapai. Analisis berdasarkan level SOLO menunjukkan peningkatan terbesar pada level relasional (50% menjadi 71%) dan extended abstract (38% menjadi 59%). Peningkatan tersebut bergantung pada kecermatan guru dalam melaksanakan setiap langkah model.
Kata Kunci: Model Pembelajaran AIR, Quizlet, Hasil Belajar Kognitif, Sosiologi, Penelitian Tindakan Kelas.

Abstract : Low cognitive learning outcomes remain a problem in sociology at the senior high school level. A preliminary study in Grade XII Social Sciences 3 at SMA Negeri 4 Mataram showed that 23 of 34 students (68%) had not reached mastery on the midterm exam. This study aimed to improve students' cognitive learning outcomes through the Auditory, Intellectually, Repetition (AIR) learning model assisted by the Quizlet application. It was Classroom Action Research conducted in two cycles of two meetings each, involving 34 students and their sociology teacher. Data were collected through teacher activity observation (22 items), a 25-item multiple-choice test based on the SOLO Taxonomy, and documentation, and were analyzed descriptively using the Miles and Huberman model. The implementation of the learning steps increased from 77% in Cycle I to 95% in Cycle II, learning mastery rose from 68% to 79%, and the class mean score increased from 68 to 75, so both success indicators were achieved. Analysis by SOLO level showed the largest gains at the relational (50% to 71%) and extended abstract (38% to 59%) levels. The improvement depended on how thoroughly the teacher carried out each step of the model.
Keywords: AIR Learning Model, Quizlet, Cognitive Learning Outcomes, Sociology, Classroom Action Research

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Introduction

Education is carried out through a learning atmosphere and classroom activities in which students actively develop their potential, so that they gain intelligence, good character, and spiritual strength. It is also a systematic process that aims to develop that potential to the fullest through planned learning. To underline how important this is, the compulsory education program of the Indonesian government requires every citizen to attend school for nine years at the basic level (Khadafi et al., 2025).

Senior high school (SMA) follows on from that stage and matters a great deal, because students here do not only build theoretical knowledge; they are also guided to form interests and potential that will serve them at university (Hendriani et al., 2024). The quality of learning at this level therefore deserves close attention. Yet Rohmah et al. (2023) found that senior high school students tend to hold misconceptions, which they attributed to waning motivation, subjects that students find uninteresting, and learning models that give little thought to students' characteristics, interests, and potential. The same problems appear in Grade XII Social Sciences 3 at SMA Negeri 4 Mataram.

Sociology is one of the subjects taught at senior high school. According to Setiawan and Komalasari (2020), sociology lessons take social phenomena as their object of study and are expected to build students' insight and their awareness of how useful sociology is in daily life, both as individuals and as members of a nation (Martin & Hermon, 2022). The subject, however, stresses conceptual understanding, critical thinking, and sensitivity to the social phenomena around students, and most of them do not yet seem able to absorb this fully. One of the main problems in teaching sociology at this level is the low cognitive learning outcomes of students.

A preliminary study was carried out on 25 September 2025 in Grade XI Social Sciences 3 at SMA Negeri 4 Mataram, whose students are now in Grade XII Social Sciences 3. It used observation, interviews, and documentation. Some students still found the material hard to understand: they struggled to answer the teacher's questions and to finish practice exercises. Midterm examination (UTS) scores pointed the same way. Of 34 students, 23 (68%) had not reached mastery and only 11 (32%) had. Interviews with the teacher and several students added that students needed to strengthen their grasp of the material before taking part in activities that call for deeper analysis.

Classroom observation told a similar story. The teacher had used the *Project Based Learning* (PjBL) model for the topic of Social Integration. Working in groups, students observed and interviewed people in their community to identify social problems, then presented and analyzed their findings in class. During this process some students still had trouble identifying problems, gathering information, and analyzing what they found. The problem, then, was not a lack of student involvement but students' limited understanding of the material before they started activities that require analysis. If it is not addressed soon, low cognitive learning outcomes can make later material harder to follow. Putra et al. (2022) reported a comparable situation: low conceptual understanding and low sociology learning outcomes among Grade XI students were linked to a learning process that was not working well.

What is needed is a learning model that keeps students active but also helps them take in information, work with it, and firm up their understanding. The *Auditory, Intellectually, Repetition* (AIR) model fits this need. Lazwardin (2025) describes AIR as an approach that stresses listening (*auditory*), intellectual thinking (*intellectually*), and

repetition (*repetition*), so it can accommodate different learning styles. Hasanah and Supriansyah (2022) add that students receive information by hearing it, process it with their intellectual abilities, and strengthen their understanding by going over the material again. Earlier studies gave encouraging results. Badawi et al. (2022) reported better cognitive learning outcomes among elementary school students after AIR was applied. Tuo and Ahmad (2022) recorded a rise in learning mastery from 71.4% to 90.5% over two cycles. Bonatua et al. (2021) found that the mean score went from 48.08 on the pretest to 78.3 on the posttest.

The *repetition* stage needs media that make repetition structured and appealing. When repetition happens only through question-and-answer or conventional exercises, students get few chances to consolidate what they know. One option is the *Quizlet* application, an online learning tool that is easy to use on a smartphone and has been reported to improve students' memory because it allows repetition (Azhari et al., 2023). Its flashcard feature is reported to be twice as effective as printed flashcards (Ariwibowo & Purwanto, 2021). Most earlier AIR studies were done in mathematics and without any dedicated digital medium. This study applies AIR to sociology, on the topic of Globalization and Digital Society, and supports its *repetition* stage with *Quizlet*.

Given these considerations, this study aims to improve students' cognitive learning outcomes by applying the AIR learning model with the help of *Quizlet* in Sociology in Grade XII Social Sciences 3 at SMA Negeri 4 Mataram. In theory, it is expected to add to research on AIR combined with digital media in sociology lessons. In practice, it offers students more meaningful learning experiences, gives teachers an alternative learning model, and gives schools something to consider when improving sociology learning through technology-based media.

Research Method

This study used Classroom Action Research (CAR). In CAR, teachers act as researchers in their own classrooms, alone or together with others, by planning, carrying out, and reflecting on their actions to solve a learning problem (Dahlia et al., 2023). The study ran for two cycles of two meetings each, with 5 × 45 minutes allocated per cycle. Each cycle had four stages: planning, action, observation, and reflection. Cycle I took place on 21–22 August 2026 and Cycle II on 28–29 August 2026.

The study took place in Grade XII Social Sciences 3 at SMA Negeri 4 Mataram, West Nusa Tenggara. The subjects were 34 students (20 male and 14 female) and the sociology teacher of the class, who carried out the intervention and was observed during the lessons. Students sat in groups of about four to six to make interaction and cooperation easier. The material was Globalization and Digital Society, covering the meaning of globalization, the development of digital society, and how society responds to globalization and the digital era.

The intervention was the AIR model supported by *Quizlet*, carried out in seven steps: (1) the teacher forms heterogeneous learning groups; (2) the teacher presents the material by displaying it and explaining it orally, while students listen and take notes; (3) the teacher directs each group to discuss the material and analyze cases; (4) each group presents its discussion results to the class (*auditory*); (5) the other groups ask questions or respond; (6) each group discusses those questions to find solutions based on the concepts learned (*intellectually*); and (7) the teacher gives a quiz through *Quizlet* to repeat the material (*repetition*).

Data were gathered in three ways. Observation used a teacher activity sheet of

22 items to see how far the steps of the AIR model with *Quizlet* were carried out. The test had 25 multiple-choice items on Globalization and Digital Society, written with reference to the SOLO (*Structure of the Observed Learning Outcome*) Taxonomy, from the *unistructural* to the *extended abstract* level (Azmia & Soro, 2021), and was given at the end of each cycle. Documentation covered teaching modules, textbooks, photographs of activities, and field notes.

Data were analyzed with the Miles and Huberman model of data reduction, data display, and conclusion drawing (Sugiyono, 2023). Test answers were scored and described to find the percentage of students reaching mastery and how it changed from one cycle to the next. The teacher's implementation of the actions was calculated as DP = (n/N) × 100%, where DP is the percentage of implementation, n the score obtained, and N the maximum score. Results are presented in narrative form and in a table. The intervention was judged successful if:

a) the implementation of the AIR learning model assisted by *Quizlet* reached 90%; and
b) students of Grade XII Social Sciences 3 reached learning mastery based on the Learning Objective Achievement Criteria (KKTP) of 75.

Findings and Discussion

1. Cycle I: Implementation, Results, and Reflection

In the planning stage, the researcher and the teacher wrote a Grade XII teaching module based on AIR, set up the *Quizlet* material, prepared the multiple-choice test and the observation sheet, and got the teaching materials ready. The intervention ran over two meetings, each with opening, main, and closing activities.

In the first meeting the teacher opened the lesson, presented the material orally while displaying it, and asked students to write down the key points (*auditory*). Students then formed groups and analyzed a case given by the teacher (*intellectually*), followed by presentations and questions. In the second meeting, students again listened and took notes, analyzed the case in groups, and presented their results. They then did the *Quizlet* quiz (*repetition*) and the test, after which the teacher gave feedback and led a reflection on the lesson.

Observation showed that of the 22 planned teacher actions, only 17 were carried out (77%), short of the 90% target. In the test, 23 of 34 students (68%) reached mastery and the class mean was 68, so the 75% target was not met. Two students were absent in this cycle, one because of illness and one because of a suspension. The observer noted several shortcomings:

a) the teacher did not check students' readiness, so some students were not yet focused and the classroom atmosphere was somewhat disorderly;
b) the teacher did not explain the learning model being used, so students were unaware of the sequence of activities;
c) the teacher did not guide the discussions, so the division of tasks among group members was uneven;
d) the teacher did not announce that the quiz would be held at the second meeting, so students were insufficiently prepared;
e) the teacher did not conduct apperception and did not give students an opportunity to ask questions before the discussion began;
f) the teacher did not guide students to connect the phenomena in the case with the concepts of globalization and digital society, so students' conceptual understanding remained limited; and
g) the teacher did not lead the students in prayer.

In a joint reflection, the researcher, the teacher, and the observer agreed that in Cycle II the teacher would check students' readiness and attendance, explain the steps of the AIR model with *Quizlet* before the lesson, do an apperception linking the material to students' daily experiences, allow questions before the discussion, and announce the quiz early. The observer would also help guide and monitor group discussions so that every member took part and tasks were shared evenly.

2. Cycle II: Improvements and Results

In Cycle II the teacher put into practice the improvements agreed on in the Cycle I reflection. In the first meeting the teacher opened with a greeting, checked attendance, linked the material to students' real lives, stated the learning objectives, and explained the model to be used in both meetings. Students listened and noted the key points (*auditory*) and could ask questions before the discussion. They then analyzed the case in groups and presented it (*intellectually*), and the teacher reinforced the presentations. At the end of the meeting the teacher told students that the quiz would be held at the next one.

In the second meeting, students scanned the barcode or joined *Quizlet* and did the quiz while the teacher monitored (*repetition*), then took the test. The teacher gave feedback, led the reflection, and closed with a prayer. Observation showed that 21 of the 22 actions were carried out (95%), above the 90% target, with only one left undone. In the learning outcome test, 27 of 34 students (79%) reached mastery and 7 (21%) did not. The class mean was 75, so the 75% mastery target was met.

3. Comparison of Cycle I and Cycle II

Table 1 summarizes both cycles. The teacher's implementation of the actions rose from 77% to 95% (18 percentage points), mastery rose from 68% to 79% (11 percentage points), and the class mean went from 68 to 75. Both success indicators were met in Cycle II, so the study was considered successful.

Table 1. Comparison of Cycle I and Cycle II results

Aspect	**Cycle I**	**Cycle II**	**Gain**
Implementation of teacher's actions (%)	77	95	+18
Students achieving mastery (%)	68	79	+11
Students achieving mastery (number out of 34)	23	27	+4
Class mean score	68	75	+7

Source: processed research data, 2026.

Before the intervention, only 32% of students (11 of 34) reached mastery on the midterm exam. The midterm differs from the end-of-cycle tests, so the two cannot be compared strictly, but the pattern runs in the same direction as the improvement across both cycles.

4. Improvement in Cognitive Learning Outcomes

Applying the AIR model with *Quizlet* improved students' cognitive learning outcomes from Cycle I to Cycle II. The class mean rose from 68 to 75, a gain of 7 points. The number of students reaching mastery grew from 23 to 27 out of 34, so the mastery rate went up from 68% to 79% (11 percentage points) and passed the 75% target. As a rough starting point, only 11 students (32%) reached mastery on the midterm. That exam differs from the end-of-cycle tests and the two cannot be compared strictly, but the pattern points the same way as the improvement across the two cycles.

5. Achievement by SOLO Taxonomy Level

Cognitive learning outcomes were analyzed using the four levels of the SOLO Taxonomy: *unistructural*, *multistructural*, *relational*, and *extended abstract* (Azmia & Soro, 2021). The *unistructural* level means understanding one aspect or one piece of information. At the *multistructural* level, students understand several aspects that are not yet connected. At the *relational* level they can link various aspects into a whole understanding, and at the *extended abstract* level they can evaluate, generalize, or apply concepts in new situations. The 25 test items were written with reference to these four levels.

Unistructural items asked students to relate the influence of globalization to the connectedness of the world's societies and to identify features of digital society. Here the gain was 14 percentage points: in Cycle I only 24 students (71%) answered correctly, and in Cycle II 29 did (85%). At this level students could recognize one main concept, such as the definition of globalization, or name one feature of digital society. This ability is the basis of early understanding. Students who could answer the probing questions already had a good initial grasp, and what they achieved at this stage came from listening to the teacher's explanation and noting key points.

The *unistructural* results are supported by the *auditory* stage. This stage started with a probing question from the teacher, which students answered; the teacher then presented the Globalization and Digital Society material orally while displaying it, and students listened and noted the key points. Such activity belongs to the unistructural level of the SOLO Taxonomy, the ability to recall a single aspect (Azmia & Soro, 2021), because students' hearing is stimulated to pick up a single fact, such as the definition of globalization or a feature of digital society. Listening, answering probing questions, and noting important concepts therefore helped students acquire and understand the basic information they needed for the *unistructural* items.

At the *multistructural* level, items covered the drivers of globalization, the effect of digital technology on economic activity, and the harm done by unverified information. In Cycle I, 20 students (59%) answered correctly; in Cycle II, 26 (76%) did, a gain of 17 percentage points. Here students began to identify several concepts, factors, or effects, for example listing several drivers of globalization or several positive and negative effects of the digital era one by one, but the links between them were not yet fully formed. This showed on answer sheets, where students named many positive and negative effects of the digital era but only as separate lists.

In the *intellectually* stage, students worked in groups to analyze case studies: the story of Bu Aminah in Cycle I and the family of Pak Herman in Cycle II. They identified the positive and negative effects in each case and linked them to concepts, then presented their results and answered questions from other groups. The *multistructural* results are supported by this stage, since group discussion, case analysis, questions between groups, and working through the information helped students widen their understanding from one aspect to several.

At the *relational* level, items asked students to analyze the relationship between globalization and the development of digital society, and the influence of globalization on cultural change. Success rose by 21 percentage points: only 17 students (50%) passed this level in Cycle I, against 24 (71%) in Cycle II. Students at this level no longer just listed pieces of information. They began to connect concepts, explain cause and effect, and link social phenomena to sociological concepts. This appeared when the teacher

guided students to connect real phenomena in the case with sociological concepts, and they began to grasp causal relationships, as in an item asking how Bu Aminah's online business changed the pattern of her economic interactions.

Sociology requires students to relate concepts to the social phenomena around them, so intellectual activity matters a lot. In Cycle I students analyzed cases, but the teacher did not guide the discussions or direct students to connect phenomena with concepts, so conceptual understanding stayed limited and tasks were shared unevenly. In Cycle II the observer helped guide and monitor discussions, students could ask questions before discussing, and the teacher reinforced the presentations. More directed guidance, chances to ask questions, reinforcement from the teacher, and support during analysis helped students join information into a more complete picture, so the gain at the *relational* level appears linked to a better learning process. This more directed discussion fits with the rise in students reaching mastery from 23 to 27 out of 34 and in the class mean from 68 to 75.

At the *extended abstract* level, items required evaluation, generalization, solutions, or applying concepts in new situations. In Cycle I, 13 students (38%) answered correctly, and in Cycle II 20 did (59%), a gain of 21 percentage points. Students at this level are expected to evaluate solutions to the effects of globalization and the challenges of the digital era, suggest alternative actions for dealing with the flood of digital information, and apply the idea of using digital technology to develop local potential in different social contexts.

Students' abilities changed in quality between the two cycles. First, in Cycle I students were mostly able only to recognize a single concept and list several effects separately, and could not yet connect the phenomena in the case with the concepts of globalization and digital society as a whole. Second, in Cycle II students began to link phenomena to sociological concepts and explain cause and effect. Third, the change was clearest at the *relational* level (24 students, 71%) and the *extended abstract* level (20 students, 59%). This suggests that in Cycle I students' work was mostly at the *multistructural* level. (TABLE)

6. The Repetition Stage and the Role of Quizlet

In the *repetition* stage the teacher gave a quiz through *Quizlet* to strengthen memory. Students scanned the barcode or joined *Quizlet* and did the quiz while the teacher monitored, followed by a multiple-choice test at the end of the cycle. The digital quiz pushed students to recall the patterns of relationships among the concepts they had learned.

Repetition through *Quizlet* serves to strengthen retention and recall of concepts, and so to reinforce memory and understanding. *Quizlet* makes repetition more structured and more appealing, because students can review the material through quizzes and flashcards on different devices. This agrees with reports that *Quizlet* improves students' memory (Azhari et al., 2023) and offers features for reviewing lessons (Fadhilawati et al., 2022). In Cycle I the teacher did not say that the quiz would be held in the second meeting, so students were not well prepared; in Cycle II this was announced at the end of the first meeting. The result shows in learning mastery, which rose from 68% (23 of 34 students, mean 68) in Cycle I to 79% (27 of 34, mean 75) in Cycle II, an 11-point gain above the 75% target, together with implementation of the learning steps rising from 77% to 95%. Teachers should also prepare for limitations noted in the literature, such as the need for internet access and uneven content quality (Limbong, 2025), for example by preparing their own

quiz sets and checking connectivity before the lesson.

7. Supporting Factors and Comparison with Previous Research

The improvement in Cycle II cannot be put down to one factor, since several changes to the intervention were made at once: apperception linking the material to daily life, an explanation of the learning steps, chances to ask questions, guidance during discussion, reinforcement from the teacher, and the use of *Quizlet* with early notice of the quiz. The rise in students' mastery went together with the rise in the teacher's implementation of the steps (77% to 95%). This suggests that what the AIR model with *Quizlet* delivers depends on how completely and carefully each stage is carried out, from checking readiness, explaining the steps, and doing apperception to guiding discussion and announcing the quiz. It agrees with the view that the AIR model needs teachers who are ready to design problems that suit students' abilities (Ekasari et al., 2021).

These findings support earlier research on how well the AIR model works. Badawi et al. (2022) reported better cognitive learning outcomes among elementary school students, Tuo and Ahmad (2022) recorded a rise in mastery from 71.4% to 90.5% over two cycles, and Bonatua et al. (2021) a rise in the mean from 48.08 on the pretest to 78.3 on the posttest. This study shows a similar tendency, with mastery going from 68% to 79% and the mean from 68 to 75, although the gain is smaller and a strict comparison is impossible because the school level, subject, and research design differ. It also goes beyond earlier work in two ways: it was done in sociology at senior high school, whereas most AIR studies were in mathematics, and it analyzed learning outcomes by SOLO level. Using *Quizlet* in the *repetition* stage fits the report of Azhari et al. (2023) that the application improves students' memory and that of Ariwibowo and Purwanto (2021) that its flashcards work better than printed ones. Because the intervention was given as one package, however, the separate contribution of *Quizlet* cannot be determined.

The improvement is visible not only in higher scores and mastery but also in the quality of students' thinking: from understanding one aspect (*unistructural*), to several aspects (*multistructural*), to connecting them (*relational*), and to evaluating or applying concepts in new situations (*extended abstract*). Success in this study therefore means more than “scores went up”; the complexity of students' understanding also grew, as the SOLO Taxonomy shows.

Conclusion

Applying the AIR learning model with *Quizlet* in Sociology in Grade XII Social Sciences 3 at SMA Negeri 4 Mataram improved students' cognitive learning outcomes. The share of students reaching mastery went from 68% in Cycle I to 79% in Cycle II and the class mean from 68 to 75, passing the 75% target. At the same time, implementation of the learning steps rose from 77% to 95%, above the 90% target, so both success indicators were met in Cycle II.

The findings show that the three stages of AIR give a clear structure for building understanding: listening and discussing form the first understanding, analyzing cases deepens it, and repetition through *Quizlet* strengthens it. The results also show that the improvement depended on how carefully the teacher carried out each step, such as checking readiness, explaining the stages, doing apperception, guiding discussion, and announcing the quiz.

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