

# Teacher perception about Google Sites integrated GeoSMART approach in geography learning

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**Abstract.** This article analyzed teachers' perceptions of the GeoSMART approach in geography learning on map material. The GeoSMART approach is a new approach in Geography learning that focuses on five aspects of the learning scenario/learning experience, namely: 1) learning begins with facts and observations, 2) measurable, 3) contextual and applicable in everyday life, 4) developing reasoning/critical thinking and 5) optimization of technology in learning. The data in this article is part of the GeoSMART approach development research data, which only covers the stages: 1) analysis of problems and needs, 2) developing prototypes and doing the validation, and 3) limited testing. The study's respondents were 32 Geography teachers in West Sumatra who had participated in socialization, workshops, and learning simulations with the GeoSMART approach. Teacher perception data was obtained using questionnaires. The results showed that teachers' perceptions were generally in the very good category for all indicators asked and that the level of teacher approval was very high.

## 1 Introduction

Geography is a core subject in 21st-century learning related to the natural and social sciences [1,2]. Geography aims to equip the younger generation with knowledge, attitudes, skills, and perspectives to act according to geographical values and form a generation that is harmonious with the environment [3].

Geography learning related to spatial, maps, images, symbols and graphics [4] has evolved through the innovation and creativity of education experts such as STEM [1,5], TPACK [6], Lesson Study [7], learning based on geospatial technology/WebGIS [8,9], HOTS learning [10] and others. Judging from their origin, none of these innovations and developments have been developed from learning geography by researchers/experts in geography education.

In addition, facts in the field show that Geography learning is still entangled by many problems, such as limited mastery of subject content [11], expectations of student learning outcomes are low and teachers lack of confidence [12], low student interest in learning [13] and learning activities are less varied and challenging, collaboration is limited, and the use of technology is limited to delivering messages, student learning activities are still low,

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communication and collaboration are limited, and the development of HOTS is not optimal, and the integration of technology is limited [10,14-16].

Based on the above problems, a new approach in geography learning called GeoSMART was developed. A new point to highlight in this article is the GeoSMART Approach. SMART here contains the following meanings:

1.	<b>S</b>	Scientific	it means that learning begins with observing facts/data so as to spark students' curiosity
2.	<b>M</b>	Measurable	it means that the learning objectives of Geography must be oriented towards HOTS
3.	<b>A</b>	Applicable	it means that the content learned is contextual and applicable
4.	<b>R</b>	Reasoning	It means optimizing the power of reason and critical thinking
5.	<b>T</b>	Technology	it means that technology is a trigger for student activity and engagement

As a learning approach, GeoSMART is a teacher's point of view on students and learning that gives birth to ideas and ideas so that goals are achieved. According to IGU Charter 2016 [17], Getis explained that the purpose of geography education is to equip students with the knowledge, attitudes, skills, and perspectives to act according to the values of Geography [18,19]. Five aspects of the GeoSMART approach are fundamental to managing learning. The ability of teachers to manage learning is the main key to professional teacher competence [20].

The GeoSMART approach is integrated with WebGIS and Google Sites as a learning platform. The use of WebGIS in learning has been widely used because it is a way to improve the quality of learning in the digital era [8,9], provide new experiences and help students understand geographical phenomena more comprehensively and applicatively [21] as well as helping students to develop problem-solving and geographic data processing skills [22] and get data sources in real-time [23,24]. For the benefit of research, teacher technology literacy and devices owned by students, the WebGIS used is simplified and based on Google Site. However, in the 21st century, teachers are required to be able to make technology an inseparable part of learning and as a tool or medium to drive learning [25,26]. Technological advancement, information, and communication have changed the educational landscape massively at a rapid pace [27,28].

Related perceptions in this study focused on teachers' perceptions of the GeoSMART approach developed in Geography learning. Perception is a mental construction related to the process of obtaining something [29]. Perception is the main form of cognitive contact of man with the world around him [30]. Perception is the experience gained from the body's sensors [31], illusions, and possibilities of the world [32]. Perception in research is useful for understanding the human sensing system's ability to adjust (confirm) the information obtained [33]. In this study, teachers' perceptions were obtained through questionnaires with a Likert scale after teachers participated in socialization, training, and simulation and after applying the GeoSMART approach in their respective classes. Before perception was requested, teachers were introduced to the GeoSMART approach, trained to implement it, followed simulations, and applied them in their respective classes.

## 2 Method

In general, the research carried out is development research with the development model used is Plomp with the following steps;

- 1) Problem identification and needs analysis,
- 2) Product development and implementation

### 3) Evaluation

Literature study, observation, interviews, and learning analysis are carried out during the problem identification stage. The development and implementation phase is carried out by developing Webgis-Based GeoSMART Learning Development, which includes learning tools, media, learning resources and methods, as well as learning assessment.

GeoSMART Learning is equipped with learning tools, namely RPP / Learning Modules, Teaching Materials, worksheet, and learning outcome tests. The prototype model will be validated by learning and material experts as well as linguists. The validated product is then revised. The evaluation stage is carried out with trial 1 (practicality) with the aim of assessing the implementation of the model, student activeness, teacher and student responses. After the product is revised, trial 2 (effectiveness) will be carried out using a pseudo-experimental design with a non-equivalent control group design pattern (pretest and posttest). In this article, the data presented are data on the steps of problem identification and needs analysis, prototype development, and validation, as well as data on teacher perceptions after participating in socialization, training, and learning simulation by applying the GeoSMART approach. The number of respondents was 32 geography teachers in West Sumatra. The research will be conducted from July – December 2023 at Universitas Negeri Padang and partner schools spread across 10 districts/cities in West Sumatra.

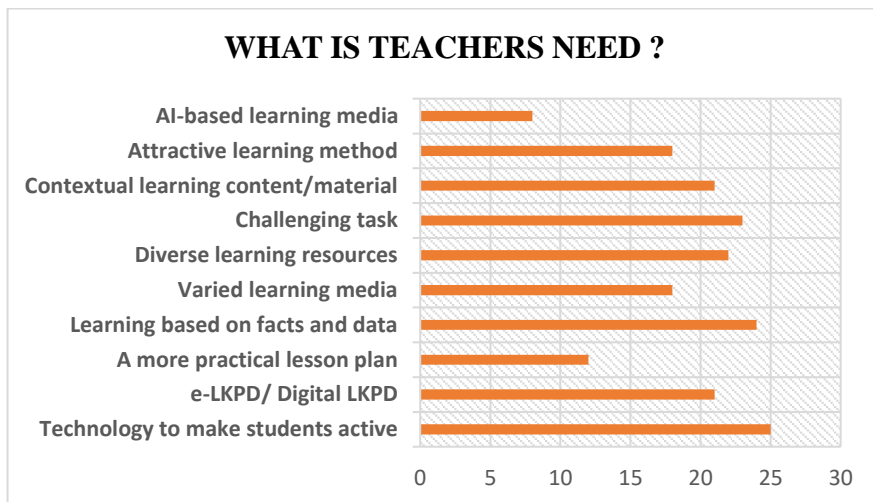
Teachers' perception data were collected with a questionnaire using a Likert scale with four answer choices: 1) strongly agree, 2) agree, 3) disagree less, and 4) disagree. Then, the average score is obtained. Then it is converted to a percentage. The next step is to interpret the data using criteria: 1) very good, 2) good, 3) less good, 4) not good.

## 3 Results and Discussions

The process of data collection of teachers' perceptions of the GeoSMART approach is carried out through the following several reasons:

- 1) Perform problem identification and needs analysis. The results of learning observations conducted in five high schools in Padang City during March-May 2023 found four main problems, namely:
  - 1.1) Learning is still teacher-centered.
  - 1.2) Questions or exercises given during learning are still at the LOTS and MOTS levels.
  - 1.3) Student engagement in learning is still low.
  - 1.4) The use of technology is still limited.

Based on the polling, the aspects needed by teachers related to the urgent development of Geography learning are:



**Fig. 1.** Aspects that teachers need.

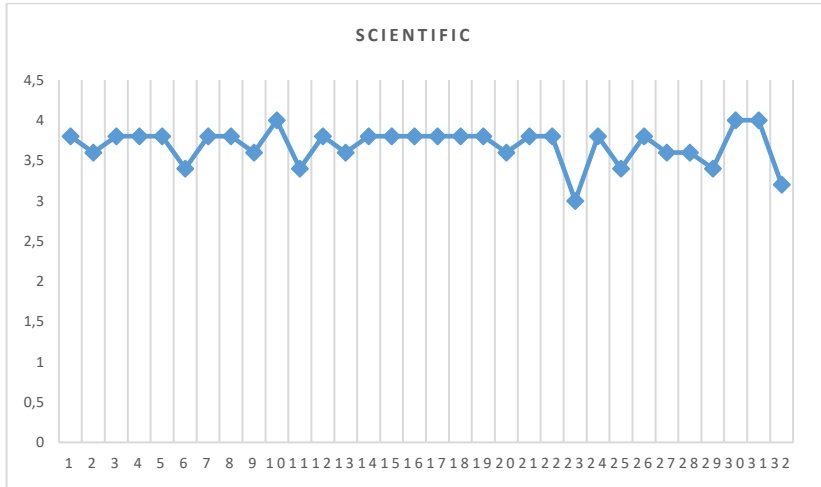
Based on the figure 1, the GeoSMART learning approach was developed with five main aspects. As shown in the following table;

**Table 1.** Aspects of GeoSMART.

No	Aspects	Explanations	GEOSMART
1	Scientific	Learning begins with data/facts/observations	All aspects of the GeoSMART approach should be written in the lesson plan/lesson plan
2	Measurable	Learning objectives should be measurable and focused on HOTS	
3	Applicable	Learning materials are contextual and applicable	
4	Reasoning	Learning gives space to develop reasoning / critical thinking	
5	Technology	Technology is integrated into learning.	

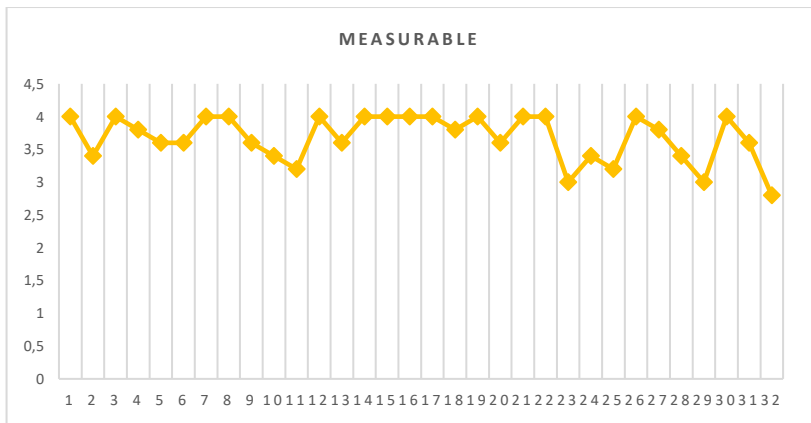
- 2) Develop learning tools relevant to the GeoSMART approach, such as RPP, LKPD, Assessment and others.
- 3) Develop a Google Site-based learning platform.
- 4) Validation of development products, namely RPP, LKPD, Assessment, and Learning Platform.
- 5) Conducting GeoSMART socialization and training to 30 partner teachers/respondents from 10 districts/cities in West Sumatra. The first activity will be held online on August 5, 2023. Then, offline training activities and simulations will be conducted on August 12 – 13, 2023.
- 6) Teachers carry out learning in their respective schools by applying the GeoSMART approach for 2 – 4 meetings from August to October 2023. Teachers reflect on the implementation of learning
- 7) The teacher filled out the questionnaire Teachers' perceptions of the GeoSMART approach. The result is as follows:

7.1) **SCIENTIFIC** aspect. Five statements related to data/fact/case-based learning are proposed in this aspect. The respondents' approval rate is at a very high level. As shown in the following graph in figure 2:



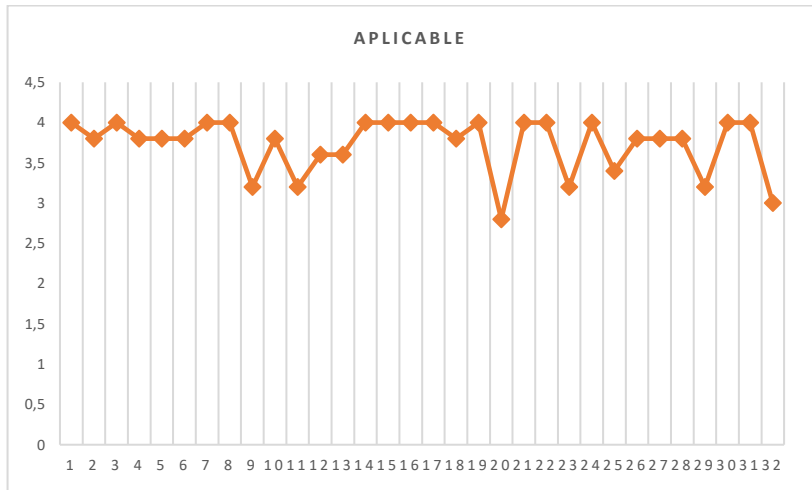
**Fig. 2.** Scientific aspect.

7.2) **MEASURABLE** aspect. Measurable learning. Five statements related to the need for teachers to set high-level learning objectives (HOTS) were submitted. The respondents' approval rate is at a very high level. As shown in the following graph in figure 3:



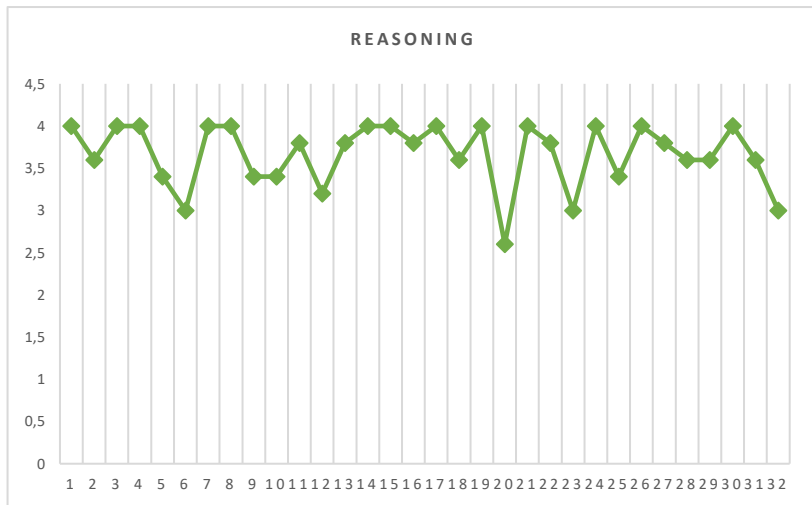
**Fig. 3.** Measurable aspect.

7.3) **APPLICABLE** aspect. Learning content that is contextual and applicable to students. Five statements were submitted, and the respondents' approval level was very high.



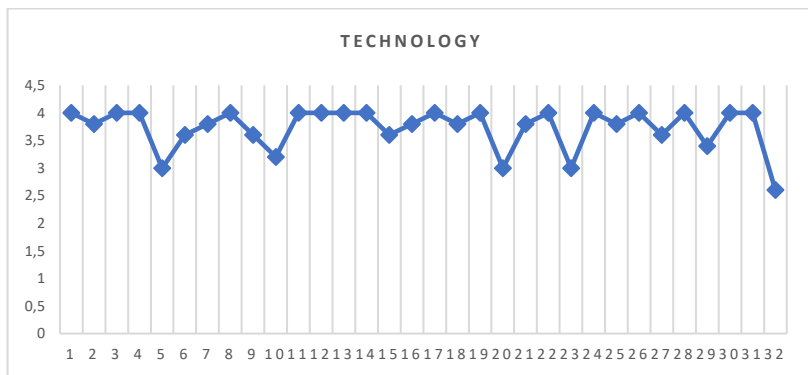
**Fig. 4.** Applicable aspect.

7.4) **REASONING** aspect. Reasoning. In the questionnaire, there are five statements about the need to design learning that can trigger students to develop reasoning and critical thinking. The results of the teacher opinion survey showed that most teachers strongly agreed, and the approval rate was at a very high level. As shown in the following graph in figure 5:



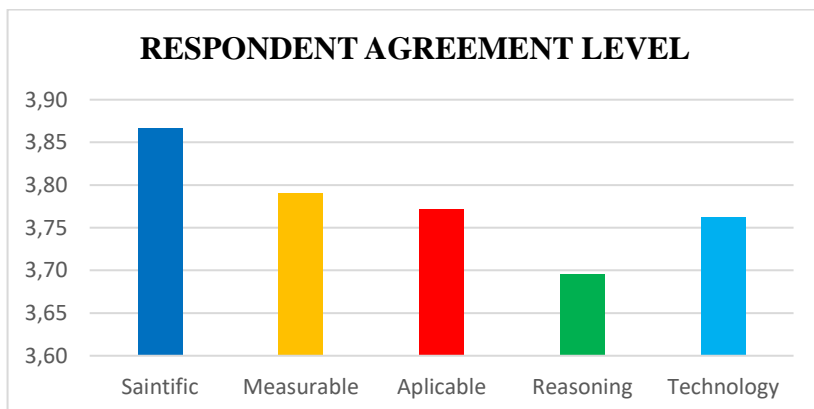
**Fig. 5.** Reasoning aspect.

7.5) **Technological** aspect. Five statements were submitted that refer to the need for technology in geography learning, especially geospatial technology. The questionnaire results showed that the respondents' approval level was very high.



**Fig. 6.** Technology aspect.

The results of the teacher perception questionnaire on the GeoSMART approach showed that the respondents' approval level was very high. These results strengthen the development of the GeoSMART approach based on the analysis of teacher needs for learning development and the results of teacher perception questionnaires. The following is an overview of teacher approval levels on five aspects of the GeoSMART approach.



**Fig. 7.** Respondent Agreement Level.

In the 21st century, the study of Geography must be in harmony with the changes and progress of human life. 21<sup>st</sup>-century Geography teachers must transform into creative and innovative teachers so as to be able to present interesting, challenging, and impressive learning. 21<sup>st</sup>-century learning skills known as 4K must be developed, dialogue and collaboration must occur, and technology must drive learning. Especially in geography learning, geospatial technology must be introduced as early as possible, and students must become accustomed to using it in everyday life. Various applications such as Google maps, Google Earth, webGIS, and GPS Essential can be used as interesting and challenging learning media and resources.

Scientific learning is one of the characteristics of the GeoSMART approach. The activities of scientific learning are observing facts, questioning, looking for data through experiments, concluding with reasoning, and communicating the results of their findings [34]. In today's era, students must be encouraged to be sensitive to natural and social

phenomena that have been, are, and may occur, so that learning is also contextual. In contextual learning, the scientific framework becomes an important part [35] because scientific emphasizes learning to be able to present facts or phenomena so that they are directly related to the real world [36]. In scientific learning, students are required to develop knowledge, thinking skills, and solve problems based on facts / data / phenomena presented [34,35]. In addition, there is also a socioscientific term, namely scientific learning, which is more focused on improving students' scientific argumentation. In the process, at the beginning of learning, students are also presented with data or facts in the form of phenomena/problems and encouraged to assess the impact of a problem locally, nationally, and globally [37].

Measurable learning is closely related to the learning objectives designed at the beginning. Learning like this allows educators to identify student achievement, evaluate the effectiveness of instruction, and make decisions based on measurable data. [38-41]. Measured learning is also related to operational verbs contained in learning objectives. Operational verbs will make it easier for teachers to determine the measuring instruments to be used. In the era of 21<sup>st</sup>-century learning, students are required to be able to think critically. The operational verb that is recommended to be used is the HOTS level (C4-C6). Then the measurement instrument must also be adjusted to the level /operational verbs. In preparing the test, many involved a series of operational verbs to measure the achievement of learning objectives [42].

Applicable learning is a learning approach that focuses on applying the knowledge and skills learned in real-world situations [43,44]. It involves the integration of theoretical concepts into practical contexts that are relevant and beneficial to students [45]. The aim is to prepare students to be able to use the knowledge they gain in real-life situations, both in the work environment and in everyday life [46,47].

Reasoning skills are Piaget's theory of cognitive development [48]. According to Piaget, children go through a series of stages of cognitive development that span the period from sensorimotor to formal operational stage [48,49]. In this stage, abstract and logical reasoning skills develop, allowing individuals to perform deductive, inductive, and abductive reasoning better [50,51].

Technology-based learning is important because integrating technology in educational contexts provides broader access to information, increases student engagement, facilitates more interactive learning, and develops skills relevant to the 21st century, such as digital literacy and technology problem solving [52-54].

One of the supporting theories in this context is Social Constructivist Theory of Lev Vygotsky, which emphasizes the importance of social interaction in learning [52]. In technology-based learning, the interaction between students, teachers/lecturers, and technology can create a collaborative learning environment, allowing the exchange of ideas, discussions, and joint problem-solving through digital platforms [55].

In the GeoSMART approach, technology is a trigger for student activities and involvement in learning. In addition, questions/tasks/problems that are contextual and have a close relationship with student life must be the main content of learning. Contextual problems/tasks/problems will encourage students to think harder and critically. Critical thinking is a cognitive activity



that is related to the use of the mind. Learning to think in an analytical and evaluative critical way means using mental processes such as attention, categorization, selection, and judgment [56]. Critical thinking is an important aspect of improving the quality of human resources [57], part of logical-mathematical intelligence [58], as well as part of higher-order thinking skills [19,59].

## 4 Conclusions

The GeoSMART approach in learning Geography includes five aspects, namely 1) scientific, 2) measurable, 3) applicable, 4) reasoning, and 6) technology. The results of the questionnaire show that teachers have a perception that five aspects of GeoSMART are indispensable in learning. The approval rate of teachers is at a very high level.

## 5 Acknowledgement

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