
GeoSMART; A New Approach for Geography Learning in the 21st Century

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Abstract

The development of human life in the 21st century requires teachers to be more creative in designing learning that is more interesting, challenging and impressive. Interesting learning is learning that is presented with the teacher's brilliant ideas in the form of methods, media and learning resources. Challenging learning can be defined as learning that is able to develop students' reasoning, critical thinking and analytical skills. Meanwhile, impressive learning is learning that is framed by example, character and universal human values. The GEOSMART approach was developed as an alternative solution to the problem of Geography learning which is still teacher-centred, has minimal student involvement and limited use of technology. There are five aspects in the GEOSMART approach, namely, 1) scientific, 2) measurable, 3) applicable, 4) reasoning and 5) technology. Development is carried out using the Plomp model. The results of validation by experts show that the development product is in the very valid category. Meanwhile, the practicality test results show that the development product is in the very practical category. The results of effectiveness tests based on the results of experimental research in seven schools in West Sumatra show that the GeoSMART approach can improve student learning outcomes, especially student involvement in learning and critical thinking abilities.

Keywords: GeoSMART Approach, Geography Learning, Critical Thinking Ability.



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Introduction

Geography has an important role in preparing the younger generation who have character, care, love for the homeland and as earthlings who are in harmony with the environment. With geography, students can understand the environment they are in comprehensively. Not only knowledge, geography learning equips students with attitudes and values, skills and geographical perspectives. Supposedly, Geography is studied by learners all over the world, and becomes a key subject for in every school (OECD, 2008;Nofrion et al, 2019, IGU, 2016).

In Indonesia, geography material is taught from elementary school to secondary school. In elementary and junior high schools, it is integrated into social studies subjects, while at the high school level, it is taught in the form of its own subjects. However, geography is only studied by students majoring in social sciences and/or offered on a limited basis in schools. Furthermore, the condition of geography learning in the classroom is also not as expected. Many problems are encountered such as low student engagement (Nofrion et al, 2019), basic learning activities (Nofrion et al, 2019), cognitive activity tends to be at low and partial levels (ahyuni, 2022), limited use of technology (silaban et al, 2023), low access to internet-based learning resources (Rakuasa, 2023), and learning activities are less varied and lack collaboration (Nofrion et al, 2019). Next is teachers are less prepared to teach (Sari et al, 2019), teaching methods are less varied (Pramudarmo, 2000;Harris dkk, 2015). Another problem found in learning Geography is low and unstructured mastery of concepts (Thomas & Richards, 2005;Mascolo, 2009;), too dense and extensive material (Wiggins & McTighe, 2005). If this condition is left unchecked, it will certainly have a negative impact on the achievement of geography learning objectives.

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In this article, one of the efforts to improve the quality of geography learning is explained through the development of a new approach in geography learning called the GeoSMART approach. The learning approach is a way of looking at learning that gives birth to ideas and ideas to help teachers manage learning and help students to be actively and productively involved so that learning objectives can be achieved. The learning approach focuses on how students learn and how that learning should be facilitated.

The introduction is a little different from the short and concise abstract. The reader needs to know the background to your research and, most importantly, why your research is important in this context. What critical question does your research address? Why should the reader be interested?

Literature Review

Learning approaches that are well known in the world of education are student-centered learning approaches and teacher-centered learning approaches. In the GeoSMART approach, there are five things that form the basis of development, namely;

1. Process approach. The learning approach in terms of process relates to learning activities designed by teachers and how students interact with various media and learning resources as well as other students. The process approach also deals with the relationship between students and context, content, assignments and technology. Media and learning resources must be diverse and current and encourage students to use learning resources in "big data". The learning process should be interesting, challenging and memorable.
2. Content approach. The learning approach in terms of content is related to the availability of contextual content, updates and applicable. In addition to paying attention to the content content, teachers must also pay attention to how to present content, especially the presentation of content for online learning.
3. Technological approach. The learning approach in terms of technology relates to how technology is not only an intermediary but more than that technology becomes a learning locomotive (technology drive learning) even the content of learning itself.
4. Goal approach. The learning approach in terms of objectives relates to how teachers set learning goals that are oriented to higher-order thinking skills such as analytical, creative, innovative and problem solving critical thinking.
5. Assessment approach. The learning approach in terms of assessment refers to how assessment becomes the basis for learning improvement (assessment as a learning).

Method

The development of the GeoSMART approach is carried out using the Plomp development model because it is more flexible. The development steps are quite simple, namely, 1) initial research, 2) prototyping and 3) assessment. In the preliminary research, observations and interviews were conducted with geography teachers, namely as many as 32 people related to the exploration of learning problems in the classroom. After getting a learning problem, then an analysis is carried out to find out the root cause of the problem. After that, an FGD was carried out to formulate alternative solutions to overcome the root cause of the problem. Here also carried out an analysis of teacher needs and learning. The next step is to prototype/draft the GeoSMART approach along with supporting products and technologies. Validation was carried out by five experts consisting of 1 Geography learning expert, 1 person using geography scientific material and 1 media and learning technology expert. The other two validators are senior geography teachers in West Sumatra. The valization results show that learning tools consisting of lesson plans, teaching materials, media and learning resources as well as assessment instruments are in the very valid category. The results of the practicality test also show that it is very practical. ICC test results are in the adequate category. The results of the effectiveness test are presented in a separate article.

Results and Discussion

Based on the Plomp development model, the development step of the GeoSMART approach begins with:

1. Initial research that includes problem analysis and needs analysis. Researchers distributed questionnaires to 32 geography teachers in West Sumatra. The result is as follows:

a. The problems in learning Geography faced by teachers are:

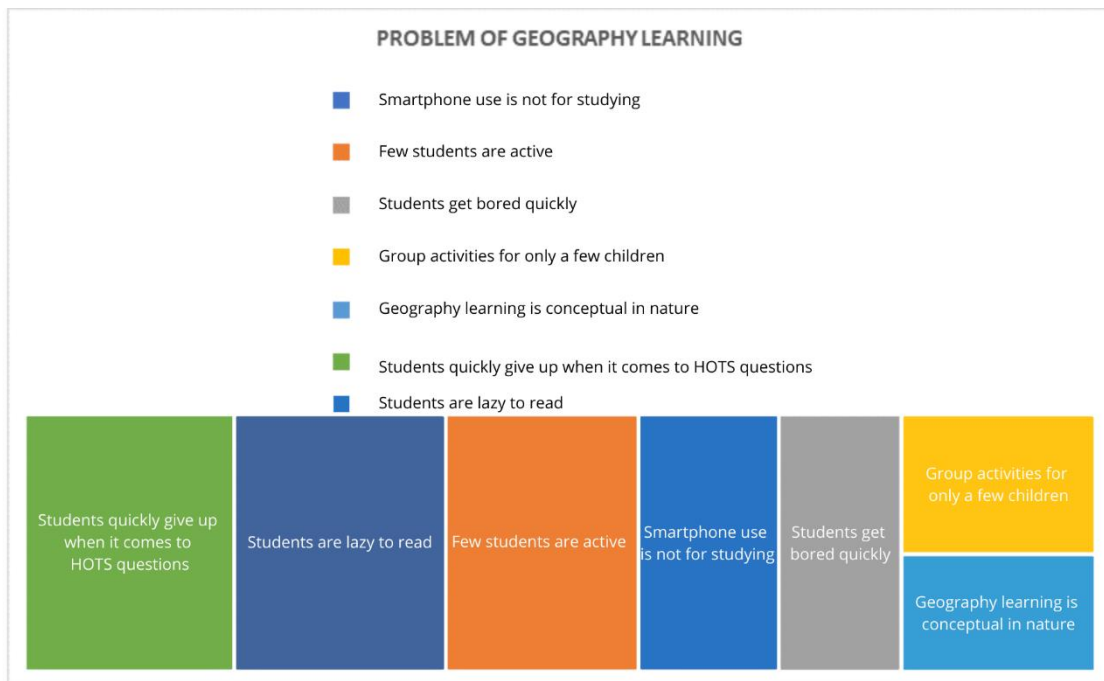


Figure 1. Problems in Geography Learning
Source: Research Data Processing Nofrion et al (2023)

b. Alternative solutions needed by teachers to overcome problems and root causes of problems in Geography learning are:

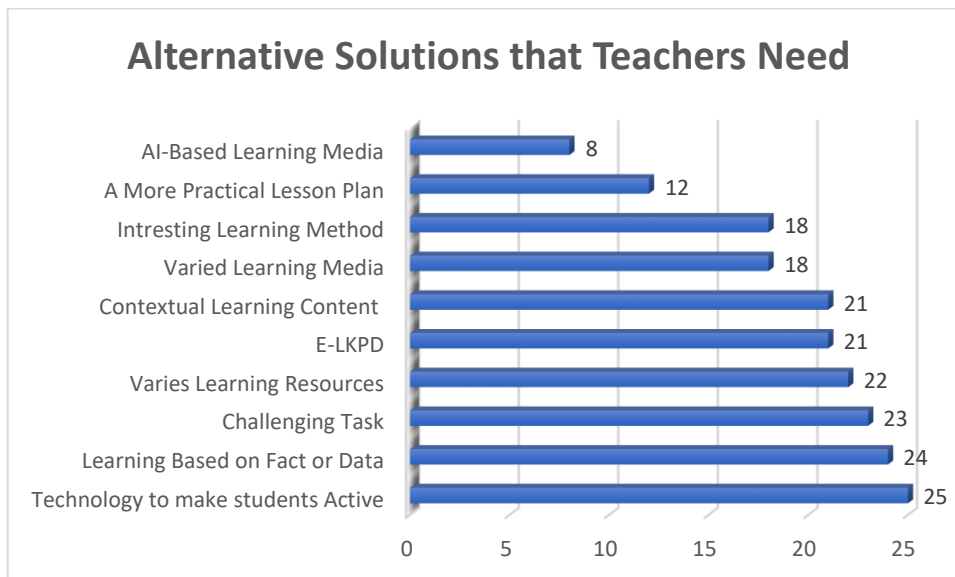


Figure 2. Alternative Solutions Teachers Need
Source: Research Data Processing Nofrion et al (2023)

2. The second step is to design a draft or prototype of the GeoSMART approach

As previously described that in this research what was developed was a learning approach. The development of approaches is certainly different from the development of models, methods or learning

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media that are widely carried out today. The development of learning models can be seen from the model development products and operational components of the model consisting of:

- a) Syntax
- b) Reaction principle
- c) Social System
- d) Instructional impact
- e) Accompaniment impact
- f) Support system

Likewise, the development of media that can be seen from media products and guidelines for their use. It's different with the development of the approach. The learning approach is a way of looking at learning that gives birth to ideas and ideas to help teachers manage learning and help students to be actively and productively involved so that learning objectives can be achieved. The learning approach focuses on how students learn and how that learning should be facilitated. In the early stages of research, learning problems and solutions needed have been revealed, then alternative solutions in the form of ideas and ideas have been designed. These ideas and ideas are summarized in GeoSMART terms. Geo for Geography or geography learning and SMART stands for aspects of learning consisting of:

Table 1. Aspect of GeoSMART Approach

No	Aspect	Explanation
1	S = Scientific	Apply scientific approach steps such as observing facts, questioning, processing, analyzing to presenting. The steps used are adjusted to the needs.
2	M = Measurable	Geography learning must be measurable learning outcomes and oriented to higher-order thinking skills (HOTS).
3	A = Applicable	The material and content learned are contextual and can be practiced in real life.
4	R = Reasoning	Learning optimizes reasoning power
5	T = Technology	Technology is not limited to media alone but as, 1) drivers, 2) guides, 3) learning content.

Source : Research Data Processing (Nofrion et al, 2023)

These five aspects are developed specifically on certain materials in the Geography curriculum in high school starting from planning, implementing and assessing learning. Through GeoSMART Learning, it is expected to create interesting, challenging and impressive Geography learning (Permendikbudristek, 2022) to develop students' learning skills in the form of, 1) critical thinking and problem solving, 2) creativity and innovation, 3) communication and 4) collaboration (www.p21.org).

The GeoSMART approach is the teacher's point of view towards students and learning that gives birth to ideas and ideas so that goals are achieved. According to IGU Charter (2016) and Getis (2011) it is explained that the purpose of geography education is to equip students with knowledge, attitudes, skills and perspectives to act according to Geography values (Nofrion et al, 2019). 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 (Farkhani, Badiei & Rostami, 2022).

The existence of the GeoSMART approach can be seen in learning through four things, namely, 1) learning planning documents (RPP), 2) learning activities in the classroom (open class and observation), 3) availability and technology support (the existence of a learning platform as a learning system management, 4) the availability of HOTS tasks and questions

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Table 2. Artifacts of GeoSMART Approach

No	GeoSMART Approach Artifacts	Information
1	Learning planning document (RPP)	RPP refers to the applicable curriculum. The five aspects of GeoSMART must be present in the design of learning activities.
2	Classroom learning activities (open class and observation),	Observations are made to ensure that GeoSMART aspects occur in learning. Good Plan, Good Action, Good Result (g-PAR).
3	Availability and support of technology (the existence of a learning platform as a learning system management	Use a specific application as a learning platform or learning system management/LMS. In this research, the learning platform uses Google Site by applying the basic principles of WebGIS. Next, it is planned to use the Padlet platform and Canva site
4	Availability of HOTS tasks and questions	At least 30% of questions or assignments are at the HOTS level

Source : Research Data Processing (Nofrion et al, 2023)

Once the GeoSMART Approach artifacts are available, the next step is validation by experts. Expert validation is needed to determine the feasibility of the GeoSMART learning approach and its artifacts to be applied in Geography learning. This validation is performed by learning experts, media and learning resource experts and learning content experts. Validation Results as shown in the following table:

Table 3. Validation Test Results

Expert	Score	Description
Expert A	86	Sangat Valid
Expert B	89	Sangat Valid
Expert r C	88	Sangat Valid
Expert D	94	Sangat Valid
Expert E	91	Sangat Valid
Rata-Rata	89.6	Sangat Valid

Source : Research Data Processing (Nofrion et al, 2023)

The results of validation by experts show that the GeoSMART approach and its development artifacts are very feasible to be used in learning Geography.

Furthermore, practicality tests were carried out by teachers and students. The result is as follows:

Table 4. Practicality Test Results

Expert	Score	Description
Expert A	41	Sangat Praktis
Expert B	38	Praktis
Expert C	45	Sangat Praktis
Expert D	47	Sangat Praktis

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Expert E	46	Sangat Praktis
Rata-Rata	43.4	Sangat Praktis

Source : Research Data Processing (Nofrion et al, 2023)

The results of practicality tests show that the GeoSMART approach and its development artifacts are in the very practical category.

GeoSMART as a new approach in geography learning emphasizes on how students learn and what facilities are provided for students to learn. The key to the success of the GeoSMART approach is the lesson plan, the learning platform used and the quality of the tasks provided. The RPP will provide an overall overview of aspects of the GeoSMART approach. The learning platform will be the driver and controller of learning activities and the questions or assignments will be the instrument to prove the success of the GeoSMART approach. 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 (Graham et al, 2020; Taghizadeh and Amirkhani, 2022). Technological Advancement. Information and Communication has massively changed the educational landscape at a rapid pace (Malik & Akkaya, 2021; Warner et al, 2021). Hopefully the presence of GeoSMART can be an alternative learning approach that teachers can apply to improve student activities and learning outcomes.

In the 21st century, the study of Geography must be in harmony with the changes and progress of human life. 21st century learning must be creative and innovative so that it is able to present interesting, challenging and memorable learning. 21st century learning skills known as 4K must be developed, dialogue and collaboration must occur and technology drive learning. Especially in Geography learning, geospatial technology must be introduced as early as possible and students must be accustomed to using it in everyday life. Various applications such as google map, google earth, webGIS, 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 (Ghozali, 2017). 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 (Tsaniyah Putri, 2020) because scientific emphasizes learning to be able to present facts or phenomena so that they are directly related to the real world (Tawil et al., 2014). In scientific learning, students are required to develop knowledge, thinking skills, and solve problems based on facts / data / phenomena presented (Ghozali, 2017; Tsaniyah Putri, 2020). 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 (Siska et al., 2020).

The GeoSMART approach also emphasizes aspects of measurable learning that are 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 (Brookfield, 2022; Marzano & Kendall, 2007; Popham & James, 1999; Suskie, 2018). 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 21st-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 (Nafiati, 2021).

Applicable learning is a learning approach that focuses on applying the knowledge and skills learned in real-world situations (Porter E. Coggins et al., 2018; Susilo & SU, 2021). It involves the integration of theoretical concepts into practical contexts that are relevant and beneficial to students (Richard I.Arends,

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2012). 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 (Hmelo-Silver, 2004; Jonassen et al., 2006).

Reasoning skills are Piaget's theory of cognitive development (Piaget, 1972). According to Piaget, children go through a series of stages of cognitive development that span the period from sensorimotor to formal operational stage (Piaget, 1972; Santrock, 2014). In this stage, abstract and logical reasoning skills develop, allowing individuals to perform deductive, inductive, and abductive reasoning better (Agus Wibowo, 2022; Robbie Case, 2013).

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 (LS Vygotsky & Michael Cole, 1978; Mishra & Koehler, 2006; Ong & Annamalai, 2023).

One of the supporting theories in this context is Social Constructivist Theory of Lev Vygotsky, which emphasizes the importance of social interaction in learning (LS Vygotsky & Michael Cole, 1978). 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 (A. W. Bates & Albert Sangra, 2011).

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 (Cottrell & Neuberg, 2005). Critical thinking is an important aspect of improving the quality of human resources (Made et al., 2022), part of logical-mathematical intelligence (Yunita et al., 2018), as well as part of higher-order thinking skills (Dewi et al., 2019; Nofrion et al., 2019).

GeoSMART as a new approach in geography learning emphasizes on how students learn and what facilities are provided for students to learn. The key to the success of the GeoSMART approach lies in the lesson plan (RPP), the learning platform used, and the quality of the tasks provided. RPP will provide an overall overview of aspects of the GeoSMART approach, the learning platform will be the driver and controller of learning activities, and questions or assignments will be an instrument to prove the success of the GeoSMART approach. Hopefully the presence of GeoSMART can be an alternative learning approach that teachers can apply to improve student activities and learning outcomes.

Conclusion

The GeoSMART approach is a new approach developed from the real conditions and future needs of geography learning. It consists of five aspects, namely 1) scientific, 2) measurable, 3) applicable, 4) reasoning and 5) technology. The GeoSMART approach has been declared valid by learning experts, media and learning resources experts and learning content experts. The results of the practicality questionnaire from teachers and students who were respondents to the study also proved that the GeoSMART approach was in the very practical category.

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