Effectiveness of student worksheets on environmental project-based e-learning model in building student character

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Abstract. Education world through learning in the classroom has a huge influence in building the values of student characters. Mathematics as a subject is given at all levels of education and has more time allocated each week than other subject has the opportunity to build student character value. This study aims to develop mathematics student worksheets and their effectiveness in the context of student character. This type of research is research with design and development. This research consists of three stages, namely Self Evaluation, Prototyping, and Field Test. The initial step of the research is to use various sources in the field and literature review. Product design is done by preparing student worksheets and student character observation sheets. Products that have been designed are then developed by means of judgment, trials and revisions. From the results of the development then a student worksheets hypothetical product is obtained and will be tested for its effectiveness. Effectiveness testing is carried out in the use of trial activities through the implementation of student worksheets hypothetical product. The results showed that the hypothetical student worksheets was effective in establishing honest, maos, mamaos, tanginas, someah, sauyunan, and discipline characters.

1. Introduction
Cianjur is one of the small cities located on Java Island Indonesia that has a local culture which is formulated in seven cultural pillars. The seven cultural pillars are “maos”, “mamaos”, “maenpo”, “tatanen”, “tanginas”, “someah”, and “sauyunan” [1]. The seven pillars are related to the character that is expected to build in the Cianjur community. The world of education through learning in the classroom has a huge influence in building these characters. The building of character through education is known as character education.

Character education that instills character values aims to advance the nation. Many of our students are smart but do not have good character. This is marked by the rampant delinquency committed by teenagers who are still in school age. Phenomena that have arisen lately include fights between students, drug and alcohol abuse and other actions that lead to criminal acts [2]. Character education is an effort to cultivate a noble value in the educational institutions environment at all levels so that the character which is basically an identity, the character that has been attached to someone will be reflected in school life or in society.

Cultivation character values in schools is manifested in the form of character education. Furthermore, [3] explains as follows: the main idea of Character Education is to improve the behavior and attitudes of students at school. Character Education are the application of social-emotional and character development in classrooms is about teaching, practicing, and modeling essential personal
and civic life habits and skills that are almost universally understood as making people good human beings.

This character value must be developed at all levels of education and subjects. According to [4] the values that need to be built in the nation's next generation are honest, hard work, respect for diversity, cooperation, tolerance, and discipline. While the character values contained in the seven cultural pillars of cianjur are “maos”, “mamaos”, “maenpo”, “tatanen”, “tanginas”, “someah”, and “sauyunan” [1]. Culture is the basis for building motivation such as [5] explain as follows. “The contextualization of mathematics and the underlying relationship between mathematics and culture as fundamental motivations in the teaching and learning processes”. Motivation in the learning process can shape characters according to their cultural environment.

Some of the character values presented by [4] and the characters in the Cianjur cultural pillar are intersect each other, relatively have the same meaning. For example the character of cooperation with “sauyunan”, these two characters will appear when students work together in a team. Whether they can become a good team depends on their cooperation or their “sauyunan” character. But two of these seven cultural pillars are difficult to implement in mathematics learning, namely “maenpo” and “tatanen”. Maenpo or pencak silat is a genuine Cianjur martial sport that must be preserved. Tatanen means farming which is the hallmark of the Cianjur community because the majority of the population make a living as farmers. So that only five of the cultural pillars that can be developed in learning. And that character values that will be improved and expected to develop in students are honest, “maos”, “mamaos”, “tanginas”, “someah”, “sauyunan”, and discipline.

Honest has the meaning of behavior carried out in an effort to make himself as a person who can always be trusted in words, actions, and work [6]. Maos or reciting has the meaning of to read the holy verses of the Quran. Religion is believed to be an important foundation in building society. Cianjur is also known as the city of santri. Mamaos or cianjur an songs are singing arts. This singing arts is a typical song that only exists in Cianjur and is only accompanied by kacapi and suling (traditional Sundanese music instrument). Through listening and singing Cianjur songs, in addition to preserving regional arts, we preserve the regional languages of Sundanese which have begun to be forgotten because they are considered ancient. Tanginas means agile. Agile behavior also shows behavior that is always passionate and hard work in acting or doing a job. Someah or friendly is a typical character of Indonesian people including Cianjur residents. Someah signifies behavior that is open in socializing and friendly with anyone. Sauyunan or rukun which has the meaning of living in harmony and peace in every activity. Sauyunan behavior is seen from a unified collaboration in social life. Discipline is an action that shows orderly behaviour and complies with various rules and regulation.[6]

Integrating character values in learning can be achieved through the appropriate student worksheets. Student worksheets that are developed must accommodate the character values that wanted to be built. Because there are many and complex character values that want to be built, a worksheet that directs students to do activities with the environment in a sustainable project and in pleasant situations is needed. The worksheet mentioned is an Environmental Project-Based E-learning Model Student Worksheets.

According to a dictionary [7], projects mean a piece of work that is organized carefully and designed to achieve a particular aim. This project was created with regard to the environment around the school. Project- based learning has a characteristic of a relatively long, holistic-interdisciplinary, student- centered learning activity, and integrated with practice, real-world student issues and developed according to their potential. The benefits of this learning can be a solution for students to learn actively, meanwhile the teacher only acts as a facilitator, motivator, and facilitator [8].

Learning that utilizes electronic media (e-learning) is assessed as fun, effective and more efficient learning so that the results that students will achieve are easier to learn and master technology so students will actively accelerate the creation of skills in students [9]. In addition, the use of e-learning can help the limitations of a teacher, especially in building the characters maos and mamaos. To give examples of maos and mamaos, special abilities and beautiful voices are needed and certainly not owned by everyone. Video playback in e-learning can be a solution to these problems. The intended
learning is assisted by student worksheets as teaching materials using e-learning media utilizing the Learning Mobile System (LMS) application.

The topic of geometry requires visualization to be able to understand it. The presence of geometry media can help students visualize geometric shapes. Student can construct geometry by utilizing the material in their environment through project activities in group. There are several advantages in group learning including increasing student achievement while increasing social relations skills, fostering tolerance and respecting the opinions of other. [10]

Based on the background that has been described, it is necessary to do research on the development of student worksheets on environmental project-based e-learning models and their effectiveness in building student character. This study was conducted on mathematical subjects in geometry in Vocational High School.

2. Methods

The research design used in this study is research and development. The research and development method of this study refers to the steps of using Research and Development by [11](see Figure 1):

![Figure 1. Steps of Research and Development. [11]](image)

The study consists of 3 stages in this study, namely: Self Evaluation, Prototyping (validation, evaluation and revision), and Field Test. First, Self-Evaluation, this stage includes: 1) Analysis, the analysis phase is the initial step of development research. Researchers in this case analyse of students, Analyse of curriculum and analyse of observation sheets according to the character to be observed; 2) The design of the device produced student worksheets of Environment-based Project e-Learning Model to build character values. The result of self-evaluation and prototyping stages is hypothetic products of student worksheets project-based e-learning models. That can be seen in Figure 2.

The third field test is a field trial. At this stage the revised product was tested using the product for the X grade students of the Vocational School who were the subjects of the study. The product tested in the field test is a product that has met the standards of validity, practicality and effectiveness predictions. This product has been validated by 7 validators who are mathematicians and mathematical education experts. As for the usage test or implementation which is the subject of the trial is grade X students at Al-Madina Vocational School, amounting to 22 people.

The instrument used is validation of product in this case the student worksheets and observation sheet. Product validation includes the content and design of student worksheets. The student observation instrument is intended to find out the character values of students during learning. Data from the results of the validation and observation were analysed qualitatively and quantitatively. The use of qualitative analysis is carried out on data from preliminary studies and program development results. While quantitative analysis is carried out on observations of character values observed during the learning process. In this article the data will be delivered and discussed in the form of student character value data.
3. Result and Discussion

Development of student worksheets is the seventh stage of the design of Research and Development [11]. Student worksheets are arranged based on the results of judgment, product trials and product revisions. The final revision results in a student worksheet that is ready to be implemented in learning. During carrying out learning, students are observed regarding the value of the character. Learning takes place during two meetings. The observation was carried out to get an idea of the character values of students in the first and second meetings. The classification of student character values can be seen in Table 1.

| Score | Classification       |
|-------|----------------------|
| 1-3   | Not seen yet         |
| 4-6   | Start to look        |
| 7-9   | Start developing     |
| 10-12 | Entrenched           |

Table 1. Classification of student character values
Differences in scores in each aspect are seen from the quality and quantity of observed actions related to the intended character value. Character values observed in students are honest, *maos*, *mamaos*, *tanginas*, *someah*, *sauyunan*, and discipline. Then the results of observations of all character during the two meetings are as follows (Table 2).

**Table 2.** the results of observations of all character (honest, “maos”, “mamaos”, “tanginas”, “someah”, “sauyunan”, and discipline)

| Classification   | honest | maos  | mamaos | tanginas | someah | sauyunan | discipline |
|------------------|--------|-------|--------|----------|--------|----------|------------|
|                  | I      | II    | I      | II       | I      | II       | I          |
| Not seen yet     | 8      | 0     | 10     | 6        | 16     | 6        | 6          |
| Start to look    | 14     | 21    | 12     | 15       | 6      | 15       | 16         |
| Start developing | 0      | 1     | 0      | 1        | 0      | 0        | 0          |
| Entrenched       | 0      | 0     | 0      | 0        | 0      | 0        | 0          |

3.1. Honest
The value of honest character that can be observed during learning is through words and deeds. Students are expected to speak according to facts. In addition, in terms of working on the project students use the appropriate size listed in the worksheet also taking the materials needed to complete the project according to the provisions. Based on Table 2, it appears that at the first meeting there were still students who did not see the honest character. This can be seen from his speech which did not match the facts. However, the next meeting has shown improvements so that there is a classification beginning to appear. Nonetheless, overall it shows better honest than the previous meeting.

3.2. Maos
To be able to observe the character values of *maos*, the teacher plays chants of the Al-Quran that have been integrated in the student worksheet e-learning model as an opening before students work on the project. How is the student's response to the chant, whether he is indifferent, listens carefully, follows his reading or may be able to explain the meaning contained in the verse and has applied it in daily life. Based on Table 2, it appears that at the first meeting there were still students who had not seen the character of the *maos*. When played, their Qur'anic verses are ignored, doing other activities. But at the second meeting several of them have shown improvements. In fact there is one student who is in the classification began to develop. When he heard the Holy Qur'an, he listened and followed his reading but he could not explain about the meaning of the verse. Nonetheless, overall it shows better in maos character than the previous meeting. This character embodiment is related to religious values.

3.3. Mamaos
To be able to observe the character of the *mamaos*, the teacher plays the song *cianjuran* which has been integrated in the student worksheet of the e-learning model as a distraction after students work on the project and before they present the results of the project being worked on. How is the student's response to the song, whether it is indifferent, listens carefully, follows the lyrics or may explain the meaning contained in the song. Based on Table 2, it appears that at the first meeting there were still students who had not seen the character of the *mamaos*. When they listen to their songs, they are indifferent, doing other activities. But at the next meeting several of them have shown improvements so that there is a classification beginning to appear. The lyrics of *mamaos* use Sundanese language and the lyrics is relatively difficult to understand because the meaning is using a high language style. These difficulties are increasingly becoming because some students do not use Sundanese in their daily lives. Nonetheless, overall it shows better in mamaos character than the previous meeting.

3.4. Tanginas
To be able to observe the *tanginas* character value of the students, they are asked to compile a list of job descriptions in completing the project. By looking at the list the teacher can see whether students are slow or fast, lazy or excited about work. Based on Table 2, it appears that at the first meeting there were still students who had not seen the *tanginas* character. This can be seen from the attitude of trying
to avoid project tasks, looking lazy and not warm. However, the next meeting has shown improvements so that there is a classification beginning to appear. Nonetheless, overall it shows a better character from the previous meeting.

3.5. Someah
Someah character can be observed when students interact with teacher, students in their group and students from other groups. Whether students want to interact or be alone. This character is seen from a friendly attitude sown by a smiling when interacting with other people. Based on Table 2, it appears that at the first meeting there were still students who had not seen someah characters. This can be seen from the attitude that is reluctant to interact with other people, wanting to be alone even if there is interaction between students showing an unpleasant and forced gesture. However, the next meeting has shown improvements so that there is a classification beginning to appear. Nevertheless, overall it shows someah character that is better than the previous meeting.

3.6. Sauyunan,
To be able to observe the value of sauyunan characters students are asked to compile a list of job descriptions in completing the project. By looking at the list the teacher can see how students who get the same task can work together. Does it show good harmony and cooperation. Based on Table 2, it appears that at the first meeting there were still students who had not seen their sauyunan characters. This can be seen from the attitude that is not harmonious. However, the next meeting has shown improvements so that there is a classification beginning to appear. Even so, overall, sauyunan character is better than the previous meeting.

3.7. Discipline
The disciplinary character value that can be observed during learning is through student obedience in obeying the rules in terms of time entering class and time to complete assignments. Besides that, it can also be seen from the action of returning all items to their original places that have been used during learning. Based on Table 2, it appears that at the first meeting there were still students who did not see the character of the discipline. This can be seen from being late in going to class, completing assignments beyond the allotted time and not returning class items to the original place after they have been used. However, the next meeting has shown improvements so that there is a classification beginning to appear. Nonetheless, overall it shows better honesty than the previous meeting.

The character values observed during the two meetings have not shown maximum results. No one has yet reached a Entrenched classification. To realize good character requires a short time. Besides that character education needs to be implemented in all subjects continuously and consistently. However, the use of student worksheets of environmental project-based e-learning models can be said to be effective in building student character. This can be seen from almost all students showing an increase from the first meeting to the second meeting. The increase includes all characters measured.

Learn mathematics using e-learning based media effectively [13]. This can be seen from class management, student activities, learning outcomes and student responses that are in either category. The result of these study indicate that e-learning bases media can be implemented in mathematics learning. Related to character, e-learning based media can also be implemented for character education for students [14]. This is related to the features and characteristics of e-learning. First, using e-learning allowing students as users to manage learning according to their own need and speed, thus students can be trained to have the value of responsibility, discipline and independence. Second, e-learning features allow chatting or tele/videoconference between student and teacher, thus students are trained for communicative and peace-loving. Utilizing electronic devices also makes no boundaries between teacher and students, so students are trained to be honest and democratic in running system. The last, the learning process through electronic media can be monitored at any time on a computer, this trains students to be able to appreciate achievement.

Some subjects including mathematics do not appear to be related to character education. Whereas the success of students in achieving good result in knowledge and skills is triggered by the character they have. Thomas Lickona said that character so conceived has three interrelated parts: moral
knowing, moral feeling, and moral behavior. Good character includes knowledge of goodness, then raises a commitment to goodness and ultimately really does goodness. In other words, the character refers to a series of knowledge, attitudes, motivations, behaviours and skills [15].

4. Conclusion
The character values observed during the two meetings namely honest, maos, mamaos, tanginas, someah, sauyunan, and discipline have not shown maximum results. None of them achieved the entrenched classification. However the use of student worksheets of environmental project-based e-learning models can be said to be effective in building student character. This can be seen from almost all students showing an increase from the first meeting to the second meeting on all characters measured.

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