Mobile Based Learning to Enhance Attitudes and Knowledge About Herpetofauna in Prospective Biology Teachers

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Abstract: Students and the public have a negative perception or dislike of herpetofauna. The solution to this problem is to introduce herpetofauna through mobile learning. The research aimed to determine the effect of mobile based learning towards attitudes and knowledge about herpetofauna in prospective biology teachers. The research method used Pre-experimental Design with the form of research one-group Pretest Posttest Design. Attitude data was collected using questionnaires and knowledge using tests. The data obtained were analyzed using the Wilcoxon Signed Rank Test. The research results obtained asymp. Sig 0.00 < 0.05. There are differences in attitudes between men and women. It can be concluded that mobile based learning to enhance attitudes and knowledge about herpetofauna in prospective biology teachers.

Keywords: Attitude; Herpetofauna; Mobile learning; Online learning

Introduction

In the 21st century technological progress is very rapid. This progress has implications for the curriculum, learning materials, learning resources and teaching process (Herzberg et al., 2023; Mardiana, 2020; Park & Kwon, 2023). These advances have also drastically changed learning patterns for teachers and students (Festiyyed et al., 2023; Siahaan, 2020). In traditional learning using a blackboard, printed teaching materials have changed using technology. The integration of technology in learning has grown rapidly. The forms of technology that have been used in the learning process are e-learning, virtual laboratories, game-based learning, interactive multimedia (Alneyadi, 2019; Papanastasiou et al., 2019; Troussas et al., 2020).

Media or technology-based learning resources have the advantage of overcoming learning problems and facilitating learning activities (Jannah et al., 2020). The use of technology in learning has an impact on increasing motivation and self-confidence (Honarzad & Rassaei, 2019; Menon et al., 2020; Shanmugam & Balakrishnan, 2019). Technology provides many advantages such as making education fascinating and facilitating students' engagement in learning (Zhang, 2022). Apart from that, the use of technology in learning improves the ability of learners with 21st-century skills (Roemintoyo et al., 2022).

Learning media can facilitate students in increasing understanding, knowledge and literacy (Dibyantini et al., 2023; Alika & Radia, 2021; Bustanil et al., 2019). This is because when learning using technology, the senses of sight and hearing work to obtain information (Chan et al., 2023; Yafie et al., 2020). Apart from that, technology-based teaching media plays an important role in developing attitudes (Ismaeni et al., 2021). A positive attitude towards animals is one of the learning outcomes in biology learning.

Attitudes towards animals will have an impact on conservation and the environment. It is hoped that the understanding given about animals and the environment will raise awareness to learn to be responsible and have a positive attitude towards the environment. The more often conservation values are

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given to students, the more positive impact it will have on environmental sustainability.

In fact, research results show that students and the public have negative perceptions or dislike towards herpetofauna (Brom et al., 2020; da Silva et al., 2023; de Oliveira et al., 2019; Pereira et al., 2023). Herpetofauna will be chased and killed by humans (da Silva et al., 2021). All of this happens because of fear, cultural differences, emotional reactions, and lack of knowledge (Frynta et al., 2023; Riós-Orjuela et al., 2020). The solution to this problem is to introduce herpetofauna through mobile learning.

Many studies have been conducted on the use of mobile learning to improve process skills, critical thinking skills, interest in independent learning and literacy (Bakhri et al., 2023; Demir & Akpinar, 2018; Kurniasih et al., 2020; Nuri et al., 2023; Talakua & Elly, 2020). However, research into the effect of using mobile learning on attitudes and knowledge towards herpetofauna has never been carried out. For this reason, research needs to be carried out with the aim of finding out the effect of mobile learning on attitudes and knowledge towards herpetofauna.

Method

Research Design

The research uses the Pre-experimental Design method with the One-Group Pretest Posttest Design. The research stages in figure 1, the experimental class used in the research carried out a pre-test to determine initial knowledge and attitudes. Then the class was given treatment with mobile learning in the lesson. After that, a posttest is held to find out the final results, so that the conditions before and after can be compared. Participants in this research were 20 students (16 women and 4 men) taking vertebrate zoology courses at Biology Education, Universitas PGRI Silampari in 2023.

Instruments and Data Analysis

The instruments used in this research were questionnaires to measure attitudes and essay tests to measure knowledge. The questionnaire contains several parts. The first part, gender, and sources of information about herpetofauna. The second part measures attitudes towards herpetofauna. The attitude instrument framework towards herpetofauna was adapted from Herzog et al. (2015). The instruments used are constructively and empirically valid. Attitude and knowledge data were analyzed using the Wilcoxon Signed Rank Test using the SPSS 25.0.

Result and Discussion

Attitudes towards Herpetofauna

Based on the questionnaire given to students, attitude data towards herpetofauna was obtained (Figure 1). After using mobile learning, students' attitudes towards herpetofauna changed. Students who gave good responses decreased by 1.92%, unfavorable responses decreased by 19.23% and unfavorable responses decreased by 3.47%. This decrease had a good impact because students who had very good attitudes increased by 24.63%.

The existence of poor and unfavorable attitudes towards herpetofauna is likely influenced by the source of initial information obtained by students. Social media is the dominant source of information (Figure 3). Social media contains information that has not been verified, so it can cause misinformation for students.
Improved attitudes because in mobile learning there is verified information. This information causes changes in students' attitudes towards herpetofauna, for example the information that not all snakes are venomous. This is reinforced by the statement of Nilsson et al. (2020) information influences attitudes and behavior. Media are tools to support students' learning experiences (Fajri et al., 2024; Widiasanti et al., 2023). Furthermore, the existence of activities in mobile learning that guide students to learn outside the classroom and come into direct contact with herpetofauna causes students' attitudes to change. This is reinforced by the statement of Pirchio et al. (2021), learning outside the classroom can develop positive attitudes.

Attitude data between students based on gender towards herpetofauna has differences in every aspect (Tables 2 and 3). Female students have lower interest and concern compared to male students. However, the aspect of appreciating the scientific method in solving herpetofauna problems is higher for female students than for male students. Gender influences almost all dimensions of attitudes and knowledge towards animals. Men and women have different emotions and knowledge towards animals (da Silva et al., 2021). This difference also includes a phobia of herpetofauna whose members are venomous animals. This is confirmed by research results that fear and disgust cause a person to become phobic about herpetofauna (Landová et al., 2020; Rádlová et al., 2020).

### Table 2. Data on Attitudes of Men and Women towards Amphibians

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Interest</td>
<td>71.24</td>
<td>89.25</td>
</tr>
<tr>
<td>Caringness</td>
<td>81.25</td>
<td>93.75</td>
</tr>
<tr>
<td>Appreciate the</td>
<td>87.50</td>
<td>87.50</td>
</tr>
<tr>
<td>Scientific Method</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3. Data on Attitudes of Men and Women towards Reptiles

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Interest</td>
<td>82.14</td>
<td>85.71</td>
</tr>
<tr>
<td>Caringness</td>
<td>82.81</td>
<td>85.93</td>
</tr>
<tr>
<td>Appreciate the</td>
<td>75.00</td>
<td>87.50</td>
</tr>
<tr>
<td>Scientific Method</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mobile learning contains herpetofauna material and learning activities. This information and activities can increase literacy regarding herpetofauna. This is in accordance with the statement from Rosidah et al. (2021) technology-based learning media can increase literacy. An increase in literacy causes changes in attitudes and motivation (Missa et al., 2023).

Education in schools is an important part of efforts to enhance conservation attitudes (Rahmadani et al., 2023; Ratnasari et al., 2022). Education can produce a better understanding of the benefits between protection and development, so that it can support preserving ecosystems (Saroyo et al., 2019; Torkar & Krašovec, 2019). Teachers who have good attitudes and understanding will cause students and society as a whole to have good attitudes and understanding as well (Nousheen et al., 2020). This happens because teachers transfer knowledge and attitudes to students and society.

**Knowledge of Herpetofauna**

Based on the results of tests carried out on students, data was obtained in Table 4. The average student score before using mobile learning was 23.08. The average student score after using mobile learning was 87.60. Knowledge data analyzed by Wilcoxon Signed Rank Test obtained asymp. Sig. 0.00 < 0.05 (Table 5). Based on the results of this analysis, it can be interpreted that there
is an influence of mobile learning on students' knowledge of herpetofauna.

### Table 4. Knowledge Data about Herpetofauna

<table>
<thead>
<tr>
<th>Learning Material</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphibia</td>
<td>23.27</td>
<td>85.19</td>
</tr>
<tr>
<td>Reptiles</td>
<td>22.88</td>
<td>90.00</td>
</tr>
<tr>
<td>Mean</td>
<td>23.08</td>
<td>87.60</td>
</tr>
</tbody>
</table>

Increased knowledge because students learn using mobile learning teaching materials. Online-based learning has an impact on learning outcomes (Putri et al., 2021; Sukmawati et al., 2022). The results of this study are in line with the research results of Troussas et al. (2020), online learning media can increase knowledge.

### Table 5. Results of Knowledge Analysis about Herpetofauna

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>Post - Pre</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>-3.924</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Online learning media can increase knowledge. This is because online learning media can motivate student learning (Awwaliyah et al., 2021; Purwowidodo, 2023). Learning using learning media in the form of an Android-based application can enable student participation in class and can even access it at home or anywhere, facilitating the learning process without limits of time, space and place (Ardiansyah & Nana, 2020). Mobile learning has become a new choice for effective planning and learning strategies in an effort to achieve learning goals (Auliyah & Sari, 2021; Maasawet et al., 2023; Rahmat et al., 2023).

Prospective teachers who have attitudes and knowledge towards herpetofauna are expected to be able to transfer it to students. This causes the next generation to have good attitudes and knowledge towards herpetofauna. A teacher is obliged to educate students to be knowledgeable and sensitive to the environment, thereby making them have a better attitude towards natural resources (Larashati et al., 2022).

### Conclusion

Based on the results, it can be concluded that mobile based learning can improve the attitudes and knowledge of prospective biology teachers towards herpetofauna.

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### Conflicts of Interest

No conflict interest.

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