

# Tasks in outdoor mobile learning: A study proposal for defining quality in task design

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## Introduction

Teaching mathematics, tasks are a core component of lessons targeting different types of skills students that should attain in the classroom, both conceptual and procedural skills. Stein et al. (1996) defines a mathematical task as “a classroom activity, the purpose of which is to focus students’ attention on a particular mathematical idea” (p. 460).

Outdoor education opens a new field of application for tasks. The term outdoor education was defined by Ford (1986, p. 2) as “education in, about, and or, the out of doors.” The core of outdoor education, according to Ford, is on the one hand that it takes place “out of doors” but also that the content of the education is “about out of doors”. Similarly, Ullmann states that a ‘good’ task in mathematical outdoor activities enables students to not only gain mathematical knowledge but also knowledge about real-world objects (Ullmann, 2020). Students should, hence, be encouraged to research about real-world objects and thus learn something new not only about mathematics, but the world surrounding us.

Creating tasks that are enriching students’ knowledge not only about mathematics but also about the real-world objects outdoors can be facilitated through criteria for educators.

## Research questions

So far, the research has mainly concentrated on general task design and different uses of tasks for the classroom, but rarely for modelling tasks outdoor. In the study we will focus on the following research questions:

RQ 1: Which criteria underly a good modelling task outdoors?

RQ 2: Which impact do mobile devices have on these criteria for outdoor tasks?

## Method

Our research focuses on generating a general applicable and accepted list of criteria for task quality. Hence, we will conduct a Delphi study to answer our research questions. This method was invented in the 1950’s also for predicting the future, hence the name, however, the general concept used nowadays can be defined as follows:

Delphi is a process of structuring a written, asynchronous communication process among a large problem-solving group so that it is tailored to the nature of the problem, the characteristics of the group, and the objectives of the problem-solving exercise (Morgil et al., 2006, p. 67).

The Delphi method, hence, exploits the scattered knowledge of experts to derive a coherent opinion. It is designed to run in several rounds. Before the first round, a smaller group of experts will receive

an open answer questionnaire to give their definition of task quality in outdoor mobile learning. From these answers combined with results of a literature research (focussing on quality in modelling tasks, outdoor education tasks, and mathematics tasks in general) the first Delphi-questionnaire is designed, which will be sent to a larger group of experts. The experts then decide which of the criteria they consider to be relevant for evaluating the quality of a task. In addition, it is possible for the experts to name new criteria.

After one round, the results are being evaluated: Criteria with less than 50% approval rate will be discarded, new criteria and criteria with more than 50% approval rate will be used to form a new questionnaire for the next round. We plan on conducting three rounds. The criteria which can be derived from the last conducted round are being used to form the criteria catalogue.

## **Outlook**

The criteria catalogue taken from the Delphi method will be a catalogue filled with quality criteria for outdoor mobile tasks in mathematics. This catalogue can guide teachers to design outdoor tasks of high quality.

Additionally, the knowledge gained from the study can be taken to improve e.g., input masks for mobile. These results will be applicable to different mobile learning environments.

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