Geophysical Research Abstracts
Vol. 17, EGU2015-13943, 2015
EGU General Assembly 2015

Teaching earth science in the field: GPS-based educational trails as a practically relevant, empirical verified approach

Thomas Kisser
Department of Geography, University of Education Heidelberg, Germany (kisser@ph-heidelberg.de)

GPS devices are common use in the daily life and are used in geography classes increasingly often. Presently, specialist literature is merely descriptive and thematically reduced to the function of orientation. The questions whether they are an applicable tool for teaching earth science circumstances and if the lasting learning success shows any differences compared to normal lessons hold in a class room haven't been answered.
Neurobiological and teaching psychological knowledge support the idea that students completing the GPS-based educational trail will learn more successful compared to students in a "normal" class: A successful contextualization of modern geomedia stimulates the motivation. Geocaches are also suitable for didactical structuration. The order of "Geopoints" is chosen in a way that the structure of the landscape is being displayed adequate. The students feel addressed affectively due to the real-life encounters and experience their environment consciously.
The presented concept "GPS-based educational trail" is different from a normal geocache, which is merely a hide-and-seek-game. Here, the main focus lays on the field work and earth science. The GPS-decvices are used for the orientation between the Geopoints.
In order to get two groups with characteristics as different as possible, due to their developmental psychology, age-related education of cognitive and methodical competence, classes from grade 5 (11 years old) and 11 (17 years old) have been chosen. The different cognitive states of development require different didactical approaches. For the 11 grade the topic "rearrangements of fluvial topography" is a possible one. Using the example of anthropogenic rearrangements of the Rheinaue wetlands near Karlsruhe the interdependency between human and environment can be shown.
The "Nördlinger Ries" between the Swabian and the Franconian Jura has been chosen for grade 5. The typical elements of the Swabian Jura (karst formation, hydrogeology, typical vegetation) are provided just as well as the impressive special form of the impact tectonics.
The learning success of the 441 probands is evaluated through an anonym, unheralded test in both grades, which prompt the cognitive competence three weeks after the treatment. The learning success of the GPS-based educational trail groups is compared to groups that completed the particular topics in a carousel activity in a "normal" class. Both treatments, the carousal activity and the GPS-educational-trail are similar, because the students work at one Geopoint / learning-station after another and the amount of time given in the same.
It can be said, that the GPS-based educational trails evoke a better learning success than normal classes do, because the test results differ with partially (highly) significant differences and high effect sizes.
As the feedback given by the included teachers suggests, the new concept of GPS-based educational trail is practically relevant and realizable in every-day life. So did teachers and trainees in several trainings.
In the future, the concept could be enhanced through smartphones and tablets. Whether or not this could be a realistic option, will also be discussed.