



## **Autonomous excursions using tablets and smartphones**

Wouter Marra (1), Marin Groothengel (1), Liesbeth van de Grint (2), Derek Karsenberg (1), and Esther Stouthamer (1)

(1) Universiteit Utrecht, Faculty of Geosciences, Physical Geography, Utrecht, Netherlands (w.a.marra@uu.nl), (2) Universiteit Utrecht, Centre for Teaching and Learning, Utrecht, Netherlands

Excursions and fieldworks are valuable components for geosciences education. However, field activities can be time consuming for teachers and pose a logistical challenge to fit in regular courses. Furthermore, the participation of students diminishes with group size in case of instructor-led outings. We are developing excursions that students can follow autonomously without a teacher present, using instructions, assignments and background information on tablets and smartphones. The goal of this approach is to increase the level of active participation, and to reduce logistical and time table issues.

We developed a bike-excursion about the landscape and geology in the vicinity of our University. Such excursion was on the wish-list for several years, but posed a logistical challenge for the group of about 80 students in the available timeslot. In our approach, students had a time-window of two weeks in which they could finish the excursion in groups of 2. 8-Inch tablets with water- and shock-proof cases were available for this excursion.

For the excursion we used three apps: 1) IZI-Travel for providing the route, spoken navigation instructions, spoken explanations at stops, location-related images, assignments as text, and multiple-choose questions. 2) PDF-Maps for providing geo-referenced maps. 3) ESRI Collector which the students used to digitize polygons on a map, and to collect geo-referenced photos with explanation. These data were answers to assignments and were later used in a tutorial on campus.

The assignments where students had to collect data, and the small group size (pairs) increased the level of active participation. The use of a final tutorial on campus was important for the autonomous excursion, as it gave students the opportunity to discuss their observations and questions with their teacher. The developed teaching materials are available online to use and adapt for others. Parts could be useful for other universities and schools in the vicinity of the excursion location.