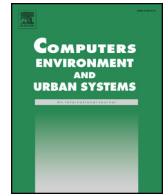




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Spatial decision support systems: Exploring differences in pilot-testing with students vs. professionals

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ABSTRACT

This study explores the implications of engaging students, versus professionals/experts, in pilot-testing of SDSS, and discusses likely differences in terms of expected outcomes for the given pilot-test.

To this end we use data collected during two pilot tests of a novel SDSS that was developed by members of our project team. The pilot-tests were done with two different groups; one made of 13 doctoral students, while the other of 12 professionals/stakeholders. The pilot-test served to gather feedback on SDSS usability and other aspects of interest to the development team. On the basis of the outcomes obtained we develop an analytical framework meant to summarise what we come to notice as key aspects distinguishing how different types of testers will engage in an SDSS pilot-test, and the type of feedback these will consequently provide. These key aspects include expertise, stage of life, and institutional context (ESI). This framework could offer some help to other teams in planning, organizing, and delivering pilot-test, and processing the assessments received.

1. Introduction

There has been a substantial growth in the demand and supply of computer-based systems meant to support professionals in spatial planning and environmental decision-making (McIntosh et al., 2011). This trend can be explained by the broadly accepted recognition that environmental issues are complex, and that decision-makers need to balance between multiple, and often competing, claims (McIntosh, Seaton, & Jeffrey, 2007; Perez-Soba & Maas, 2015; Rodela, Reinecke, Bregt, Kilham, & Lapeyre, 2015). However, research has shown that after spatial decision support systems (SDSS) are made available to the intended end users, these are used little, or not at all (Arnott & Pervan, 2008; Uran & Janssen, 2003). McIntosh et al. (2007) wrote about this and identified a need to expand the research agenda beyond technical aspects and include questions about usability, user needs and tool performance in explicit decision-making processes. Yet, there are challenges to the study of SDSS in the context of real-world decision-making. Anderson, Beazley, and Boxall (2009) offer an interesting summary of the process leading to their SDSS; they write that it started well with feedback from prospective users, but eventually ended with poor up-take of the SDSS by those who have commissioned it. Anderson et al. (2009) reflect on this and link it to poor communication between those who commissioned the SDSS and the development team, to insufficient user involvement and to insufficient feedback during different

stages of that process. They did not have a user involvement and participation strategy, but such a strategy is not common anyhow. In fact, usually the intended users are contacted ad-hoc when the development team needs to have answers to questions, information, data, or needs to pilot-test the SDSS (Rodela et al. 2017; Poch, Comas, Rodríguez-Roda, Sánchez-Marrè, & Cortés, 2004).

On the other hand, user availability is also an issue. End users of SDSS most commonly are practitioners and decision-makers with busy agendas and, despite the need for an SDSS, might not have the time or the capacity to join at meetings, or sit in pilot-test sessions. As a consequence, when pilot-testing is needed, developers and researchers often reach out to students since these are relatively easy to recruit. The involvement of students for pilot-testing of decision support systems has been reported in a number of publications to include Arciniegas, Janssen, and Rietveld (2013), Ben-Zvi (2012), Giupponi (2007), Gorsevski et al. (2013), Vahidov, Kersten, and Saade (2014), and Van der Wal, de Kraker, Kroeze, Kirschner, and Valkering (2016). However, there are methodological issues that come with the involvement of students which have not been discussed by current literature. For instance students might be asked to participate to these activities as part to course requirements, might be asked to role-play, or to simulate an imaginary scenario, about which they have very little, or no, knowledge. Yet, it is not discussed, nor understood, how such circumstances might influence their engagement with the SDSS, and the feedback

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provided. To the best of our knowledge this topic has not received much attention.

It is important to mention that the recruitment of students as research subjects to test theories, methods or tools is common across a range of disciplines as is management studies, psychology, etc. (Hoodge, 2010; Peterson & Merunka, 2014; Peterson, 2001). In psychology, where human behaviour is being investigated, students represent an accessible and convenient on-campus option to which the researcher has easy access. Such samples are referred to as convenience samples. However, since students have specific socio-economic and psychological characteristics some scholars are sceptical about the extent to which students can meaningfully participate in research that aims to generalize to a larger population. Recent failures in replicating results of key psychological studies, known as the replication crisis, sparked a vivid discussion about the use of student samples (see: Bohannon, 2015; Bower, 2016; Van Bavel, Mende-Siedlecki, Brady, & Reinero, 2016). That debate offers insight on the implications that arise from recruiting students also when pilot-testing SDSS that we consider later in the analysis. We also acknowledge a few studies in adjacent fields to SDSS where differences between students and professionals in the type of feedback provided is referred to. For instance, Van der Wal et al. (2016) observed differences in how the two groups perceived and interacted with their model. Van der Wal et al. (2016) write that students were more likely to converge towards agreement compared to professionals, but also that students discussed the model feedback in relation to the game played (i.e. virtual role playing), while professionals discussed the model feedback in relation to margins, risk and how the (actual) river is likely to behave in the future (i.e. real circumstances).

It is the objective of the present study to explore and raise questions about the implications that arise from pilot-testing SDSS (meant for professional use) with students. To this end we use data collected during two pilot tests of a novel SDSS. The pilot-test workshops were done with two different groups; one made of 13 doctoral students, while the other of 12 professionals/stakeholders. In the next section we first provide information about research methods used and about the two pilot-test workshops. Then, we present and discuss the results obtained and in building upon these we propose a simple analytical framework. Chapter Five closes the study with recommendations for research and practice.

2. Methods

This is an explorative study where we engaged in an iterative process. Thus, we started from a very practical need to pilot-test a novel SDSS, commissioned to members of our project team, and were soon confronted with the challenge of recruiting “testers” with profiles similar to those of prospective users (i.e. professionals, decision makers). Due to recruitment difficulties we then engaged students in a first pilot-test workshop run in 2013. However, aware of the professional needs this SDSS is meant to serve, questions were raised about how and on what aspects students can offer feedback useful to develop an SDSS which is able to meet professional needs. Our team then agreed on the need to recruit professionals for a further pilot-test. In October 2014 the SDSS was tested again with a group of 12 stakeholders who were all professionals.

Student sampling is a topic that in the past years has received attention, mostly in relation to the replication-crisis in psychology. We were broadly aware of the issues associated with this and the first author surveyed relevant literature then used to identify areas of general scientific concern (i.e. statistical reliability, generalizability) as well as narrower potential concerns for the SDSS applicative domain (i.e. implications of role-playing, testers lack of expertise). That led us to formulate assumptions about when, and how, a pilot-test with students would be suitable, given the purpose SDSS are meant to pursue.

Here we like to clarify that the purpose of the pilot-test workshop

we did, and report upon, was to pilot test the SDSS and not to test hypothesis about student samples. The latter emerged as a topic of concern at a given step of the SDSS development, which after reviewing literature on student samples, and upon the analysis of data collected (questionnaire and observational notes), led to the formulation of a framework meant to summarise assumptions, and capture core aspects, that we believe have a role in how different groups/sample types would engage in an SDSS pilot-test.

2.1. Background information about the (pilot-test) workshops

QUICKScan is a participatory spatial modelling method designed for group use that links user's knowledge and preferences to available spatial- and spatial-statistical data (details: Verweij et al., 2016). The QUICKScan was commissioned by the European Environmental Agency to members of our project team with the intent to support decision-makers in complex decision-making processes where spatial and other type data need to be taken into account.

The purpose of the two workshops was to pilot test the SDSS and gather feedback on SDSS usability, but also since the SDSS is meant to be used in a group context, there was a need to assess if, and how, the SDSS supports learning and helps the participants to share and integrate different knowledge. The QUICKScan workshops are informed by participatory methodology and input from all participants is sought; these are asked to work in small groups and develop model input matrices then used to build scenarios and define causal relationships between drivers and impacts (Verweij et al., 2016). During the small group activities as well as whole group discussions participants share views, knowledge, discuss the indicators and relationships between variables chosen.

A first workshop took place in April 2013. This was done with thirteen doctoral students who took part in an Impact Assessment International Summer School in Scotland (UK). The topic was “green infrastructure”, the geographic scope were EU Member States and the session was done as “a role-play” with students simulating to be European public officials. The second workshop took place in October 2014 with twelve professionals who have stakes in the issue discussed, and acted as representatives of stakeholder groups. These professionals - whose profiles included farmers, entrepreneurs, forest estate managers, park managers - are members to a partnership working on initiatives for the regeneration of a rural area in Northern Scotland (UK). The topic was “land use scenarios” and the geographic scope was a local area. The QUICKScan team had no influence on the selection of workshop participants; in the case of the first workshop participants were selected by the Summer School organizers, while for the second workshop a local gatekeeper invited all members of a local partnership and eventually twelve showed up on that day. Details about the two groups of participants are summarised in Table 1.

These two QUICKScan workshops are comparable on delivery (facilitated session with a moderator and a QUICKScan expert operating the tool), objective (collaboratively producing and discussing different scenarios), length (one day made of a full morning and afternoon) and purpose (demonstration with no formal obligations for decision-making), but differ in terms of participants profile (professionals vs. students), and stakes participants had in the topic being discussed (real stakes vs. playing a role). Both workshops foresaw that participants worked on alternative scenarios, however, the way this was delivered differed due to the participants' profiles. It was expected that students would not be very familiar with the subject matter and for this reason a role-play simulating European decision-making was prepared by development team. On the other hand, professionals were expected to be familiar with the subject matter and were asked to contribute with own expertise and opinion. All were also stakeholders who were often involved in decision-making processes about local affairs. Given that QUICKScan was developed to support professionals in participatory environmental decision-making processes, it is useful to note that the

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