How to develop and design valid, innovative and complex computer-based items?

Discussion, sharing experiences and working with innovative item types in a digital environment

Presenters:

Pia Almarlind, Assessment developer. Umea University, Sweden.

Patric Åström, Assessment developer. Umea University, Sweden.

Mattias Abrahamsson, Assessment developer. Umea University, Sweden.

Presenters' Bios:

Pia Almarlind is from Umeå University, Sweden. She has worked as an assessment developer since 2008 and had the privilege being in the start-up process when the national assessments in science for 15 year old students were developed. She is now responsible for the development process of the national assessment in chemistry but is also involved in the development process of the assessments in biology and physics. She is also a project leader for two university-based projects, one that includes developing a general working model for assessing and judging essays by using teacher moderation and one that includes developing a digital training course for university teachers in principles for test developing, assessment and grading in higher education. Pia continuously arranges and leads workshops for teachers in item and test development, assessments and grading. In 2010 she consulted as an expert by the National Agency of Education in the development work for the Swedish curriculum Lgr11, with a focus on the curriculum in science. Before working at Umea University she was a science and mathematics teacher for 10 years at lower secondary school.

Patric Åström is from Umeå University, Sweden. He has worked as an assessment developer since 2016. He is now responsible for the development process of the national assessment in biology but is also involved in the development process of the assessments in chemistry and physics. He is also involved in an university-based project that include developing a digital education for university teachers in principles for test developing, assessment and grading in higher education. Before his time at Umeå University he has been teaching science and mathematics for 20 years at lower secondary school.

Mattias Abrahamsson is from Umeå University, Sweden. He has worked as an assessment developer since 2009. He is now responsible for the development process of the national assessment in physics but is also involved in the development process of the assessments in biology and chemistry. In year 2012 Mattias was working as a teacher educator at the University. Before working at Umea University he was a science and mathematics teacher for 10 years at lower secondary school.

Why AEA members should attend this workshop:

The aim of the workshop is to gather people from different countries, contexts and with different perspectives and use the day to develop new ideas concerning developing and designing innovative and complex computer-based items in large-scale assessments, for example chat-items and simulations. We want to offer a day that balances short presentations, creative practical work and constructive discussions. By working collaboratively on concrete item examples, including both paper-based and computer-based items, and there after discuss opportunities, constraints, challenges and threats, the participants will by the end of the day hopefully have a number of new innovative item ideas for future development.

Who this Workshop is for:

The workshop is designed to engage educational professionals e.g. assessment developers, researchers, educators from different countries who are working with and/or have an interest in designing innovative and complex computer-based large-scale assessments and items.

Overview:

In Sweden the national tests are designed as a paper-based assessment, but some test parts give students the opportunity to present their proficiency orally and practically. In Sweden different universities are responsible for developing the national tests, commissioned by the National Agency of Education. In 2016 some universities were assigned to start the development of item examples for digital national tests. The idea is to gradually introduce digital national tests between 2018 and 2022. The tests are intended to measure student proficiency in relation to the Swedish curriculum and work as a support for consistent national assessment and grading.

A project group at Umeå University, which is responsible for the national science tests, has started work on a test model for a digital national test in science. The test model is supposed to be aligned with the curriculum and fulfil its national aim. The project group also wishes to fully challenge item types in the digital sphere, where e.g. animations, film clips such as courses of events and simulations are available.

The project group has in their process been inspired by the released digital item examples from PISA (http://www.oecd.org/pisa/test/other-languages/) and SimScientists (http://simscientists.org/home/index.php). Inspiration also comes from ATC21S (**Griffin,** Patrick, **McGaw,** Barry, **Care,** Esther (Eds.) 2012 and (http://www.atc21s.org/). The project group now wishes to be part of a larger network for further development work.

Questions like what do different countries' test systems look like, how do they build and ensure the quality of different item examples in a digital sphere, what do innovative digital item examples look like and how are they developed, need to be answered.

In the first session of the workshop the presenters will give an overview of the Swedish test system and will present what some concrete examples of innovative paper-based items in science look like in the tests.

In the second session the participants will have an opportunity to present some concrete examples of innovative items and share their knowledge, experiences and issues concerning the development and design of different types of innovative items in a paper-based and/or a computer-based test system. In this session the participants also will get the opportunity to answer the items. This opportunity will bring space for wider reflections around the developing potentiality.

The third session will focus on collaboration and development of ideas. During this session the participants will work in small groups with practical tasks. The purpose is to develop concrete suggestions of ideas for some selected items, and see how the digital format can be used to given the purpose of the items e.g. start formulating items based on ideas presented in earlier sessions and develop items from new ideas.

In the fourth session each group will will be given an opportunity to provide feedback concerning the items discussed in session 3 in terms of opportunities, constraints, challenges and threats.

Finally we will summarize the sessions by discussing what to bear in mind when developing different types of innovative computer-based items, how to move forward and how to create a future international network.

Time	Session	Presenter
09.00	Coffee and registration	
09.30	Welcome & introductions Outline of the Workshop	Pia Almarlind, Patric Åström, Mattias Abrahamsson
09.45	Overview of the Swedish test system and presentation of innovative items in science, focusing on aim, format, structure and content.	Presenters and participants
11.00	Break	
11.30	Presentations of innovative items, focusing on aim, format, structure and content. Individual evaluation of some specific items.	Presenters and participants
13.00	Lunch	
14.00	Practical work. Collaboration and developing ideas. Group presentations. Concrete suggestions of ideas and constructive feedback.	Presenters and participants
15.30	Break	
15.45	Summary and discussion about how to create a future international network.	Presenters and participants
16.30	Workshop close	

Preparation for the workshop:

To make the day as constructive and dynamic as possible we welcome each of the participants to put together a sample of innovative item examples and send them to the presenters one week before the conference. We also welcome each of the participants to prepare a short presentation, 10-15 min, of their own experiences working with developing the items. We also recommend the participants to bring the tools and equipment that requires to present and to give the participants the chance to answer the items.

References:

Griffin, Patrick, McGaw, Barry, Care, Esther (Eds.) (2012). Assessment and Teaching of 21st Century Skills

Quellmalz, E.S., Davenport, J., Timms, M., & Buckley, B., WestEd, (2009). Quality Science Simulations for Formative and Summative Assessment