



**RETHINKING LEARNING
IN A DIGITAL AGE**
18-20 SEPTEMBER 2017, BULGARIA

EDUsummit 2017 Summary Reports

RETHINKING LEARNING IN A DIGITAL AGE

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Kwok-Wing Lai, Joke Voogt, and Gerald Knezek

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Thematic Working Group 5

Formative assessment supported by technology

Summary Report

Mary Webb, *King's College London, UK*
Bent B. Andresen, *Aarhus University, Denmark*
Charoula Angeli, *University of Cyprus, Cyprus*
Ana Amelia Carvalho, *University of Coimbra, Portugal*
Eva Dobozy, *Curtin University, Australia*
Hans Laugesen, *National Union of Upper Secondary Teachers, Denmark*
Djordje M. Kadijevich, *Institute for Educational Research, Serbia*
Mike Phillips, *Monash University, Australia*
Doreen Prasse, *Schwyz University of Teacher Education, Switzerland*
Allard Strijker, *National Institute for Curriculum Development, The Netherlands*

Introduction

The future of assessment faces major challenges including the use of IT to facilitate formative assessment that is important for improving learners' development, motivation and engagement in learning. In many countries, in recent years, a renewed focus on assessments to support learning has been pushing against the burgeoning of testing for accountability, which in some countries, renders effective formative assessment practices almost impossible. Moreover, a systematic review by Harlen and Deakin Crick (2002) revealed that a strong focus on summative assessment for accountability can reduce motivation and disengage many learners. At the same time use of IT-enabled assessments has been increasing rapidly, as they offer promise of cheaper ways of delivering and marking assessments as well as access to vast amounts of assessment data from which a wide range of judgements might be made about students, teachers, schools and education systems (Gibson & Webb, 2015). These opportunities also extend to assessment of complex collaborative work (Webb & Gibson, 2015). Current opportunities for using IT, including for harnessing the data that is being collected automatically, for formative assessment are underexplored and less well understood than those for summative assessments. Opportunities for learning with IT and perhaps with less teacher input are increasing but this depends on students developing as autonomous or independent learners. Research in formative assessment including effective feedback has emphasised the value of peer assessment practices for developing self-assessment capabilities and hence independent learners (Black, Harrison, Lee, Marshall, & William, 2003). At previous EDUsummit the possibilities and challenges for IT-enabled assessments to support simultaneously both formative and summative purposes were analysed (Webb, Gibson, & Forkosh-Baruch, 2013). While

these challenges remain, at EDUsumMIT 2017 we focused on the opportunities and challenges of IT supporting formative assessment because effective formative assessment is known to be extremely important for learning.

Background and terminology

While a variety of definitions are evident in the literature, we adopted a definition by Black and Wiliam (2009) who characterised formative assessment as the generation and interpretation of evidence about learner performance by teachers, learners or their peers to make decisions about the next steps in instruction. This form of ‘assessment *for* learning’ allows decisions about future performance to be better founded than decisions made in the absence of formative evidence (Black & Wiliam, 2009).

Evidence from a broad-scale meta-analysis has demonstrated that formative assessment improves learning with strong effect sizes (Hattie, 2009) and has led to a renewed impetus for assessment to support learning in a variety of cultural contexts (e.g., see Carless & Lam, 2014). Formative assessment sits in contrast to summative ‘assessments *of* learning’, which are used to assess a student’s learning at the conclusion to a learning sequence and are typically based on standards or benchmarks to make judgements.

In addition to assessment *for* and assessment *of* learning, assessment *as* learning is a phrase that has crept into common use in education and reflects a renewed focus on the nature of the integration of assessment and learning and highlights the importance of the dialogue between learners and teachers and between peers engaged in formative assessments. We argued at this and previous EDUsumMITs that this integration can be supported and promoted by IT (Webb, Gibson, & Forkosh-Baruch, 2013). In addition to increasing opportunities for collecting and processing assessment data, IT has enabled a proliferation of tools including those for classroom use such as student response systems (clickers) and many online systems that provide automatic feedback. These online systems range from simple spellcheckers to sophisticated automatic feedback and ‘intelligent tutoring systems’. Furthermore more general IT facilities such as discussion boards, videocasts, videoconferencing and social media environments can support communication and dialogic aspects of formative assessment. At the same time additional sources of feedback have become available to learners. Thus, for example, a learner may choose to discuss their homework in an online forum where they may receive help from experts or peers. In order to deepen their learning experience further a student may take a Massive Open Online Course (MOOC) that supplements their school curriculum and perhaps tackles some of the topics in more depth or from different perspectives. While these opportunities offer many potential benefits they also present additional challenges for all stakeholders beyond those challenges presented by formative assessment per se.

Challenges for formative assessment supported by technology

In Table 1 we summarise the challenges that we identified together with a brief explanation and note of key issues.

Table 1
Summary of Challenges and Issues

| Challenge | Issues and Explanation |
|--|---|
| Motivational and affective aspects | How to address and describe motivational and affective issues that may influence the use and validity of assessments? |
| Datafication | How to decide which data to collect? How to analyze and interpret data and use that meaningful information for formative assessment to support teachers and learners in the process of learning? |
| Forms of feedback | How to interpret the different forms of feedback and how to provide scaffolds for teachers and learners to make sense of data in order to incorporate data all into feedback processes? |
| Balance between summative and formative assessment | How to manage the balance and relation between summative and formative assessment especially with respect to validity and transparency? Using data for multiple purposes can present a threat to the validity of an assessment. |
| Privacy and ethics | How to deal with data privacy and ethical issues? Who has access to data? How is data used? |
| Teacher education | How to deal with teacher education and lack of assessment literacy and digital literacy? |
| Horizontal skills | How to assess horizontal, general, complex skills such as 21st century skills? 21st century skills can consist of skills such as creativity, problem solving, self-regulation, critical thinking, collaboration, communication and digital literacy that are difficult to assess because of the lack of descriptions. |
| Digital Tools | How to evaluate and select tools for different assessment purposes and stakeholders, tools for formative assessment that support the process of learning and gathering data during that process? |
| Intelligent tutoring systems | Intelligent tutoring systems - What is their place in formative assessment? What form should be the output of formative assessment? Are the outputs recommendations or strict prescriptive statements? |

| | |
|-------------------|--|
| Learning outcomes | How to describe learning outcomes for formative assessment, keeping in mind cultural aspects and validity issues? Learning outcomes can be described as aims, goals, or learning objectives, related to the actual context where formative assessment is used. |
| Sorts of feedback | There are different sorts and different sources of feedback. Feedback can come from humans or processed from data. Learners, teachers and school leaders have to learn how to manage those sorts and sources. What feedback do teachers want/expect from learners? |
| Large groups | How to assess large groups of learners and to provide individualised feedback? |
| Peer assessment | <p>Promoting, managing, timing, designing peer assessments.</p> <p>How to set up a climate in which learners can give feedback online and/or face to face in a safe environment with supportive relationships between students and between students and teacher? In some cultures, e.g. Confucian heritage settings, managing the issue of “saving face”.</p> <p>Willingness and motivation to engage in peer feedback and how to establish credibility. Managing learners’ expectations. Ages of the learners for engaging in useful feedback, different contexts and groups are relevant. Learners do not always understand the goals, different sources and of sorts feedback. How to promote understanding of quality work and feedback in different contents?</p> |
| Integrity | Plagiarism and other forms of cheating are critical especially to summative assessments but understanding of expectations for integrity needs to be developed through formative processes. |

Recommendations to Stakeholders

Table 2 summarises our recommendations for stakeholders. Our experiences indicate that in many educational establishments teachers are designers of learning and assessment systems but increasingly instructional designers and software designers also have roles in creating IT-enabled assessments.

Table 2

Summary of Recommendations for Policy Makers (P), Teachers (T), Designers (D), Researchers (R) and Industry Partners (I)

| Recommendations | Stakeholders |
|---|---------------------|
| Create opportunities to encourage and develop teacher capacity to identify, foster development of, and formatively assess horizontal, general, complex 21st century skills. | P |
| Realise the potential and be aware of the challenges when using data to make decisions for formative assessment. | P |
| Create opportunities for collaborative work with stakeholders in order to examine the complex connections between meaningful data collection, data interpretation (learning analytics) and data use to support teachers and learners. | P |
| Create systems that can be adaptive to contextual sensitivities identified by ongoing dialogue involving teachers, learners, and system designers. | P, T, D, R, I |
| Give teachers and learners access to the data collection and processing model in addition to the final data state to foster understanding of the formative elements of these tasks. | P, T, D, R, I |
| Represent new forms of data by new forms of visualisation that are meaningful to stakeholders. | P, T, D, R, I |
| Provide ongoing data literacy training to enhance effective interpretation. | P, T, R |
| Increase awareness of the need to design online tasks, where appropriate, that involve and assess horizontal, general, complex 21st century skills. | P, T, D, R, I |
| Create opportunities to encourage and develop teacher identification, formative assessment and feedback provision associated with horizontal, general, complex 21st Century skills, when online systems are not appropriate for formative assessment of these skills. | P, T, R |

| | |
|---|------------|
| Incorporate formative and summative assessment of horizontal, general, complex 21st century skills (which may be highlighted through effective case studies). | P, T, R |
| Negotiate and ensure shared understanding of criteria or examples to allow for student self-assessment or peer-assessment of skill development. | P, T, R |
| Regarding learning outcomes, take into account the aims/goals etc. of different stakeholders. For example, mathematics learning has multiple purposes: as a vehicle for personal development, a way to comprehend a beautiful discipline, a tool for solving problems in industry. | P, T, D |
| Encourage discussions among stakeholders that would clarify matters for a shared understanding and appropriate collaborative implementation regarding how to describe learning outcomes. | P, T, D |
| Increase awareness among people designing learning systems (including teachers) that assessment design needs to be part of the initial learning design irrespective of other contextual issues (e.g., whether it is a face to face activity or an entire learning module) that encourage metacognition and connections within and between content. | T, D, R |
| Make learning systems flexible and customizable to allow teachers/learners to modify them for particular cohorts of learners or situations. | T, D |
| Help students/teachers/school leaders to recognize different sources of feedback and support students/teachers/school leaders in evaluating and using them. | T |
| Develop students'/teachers'/school leaders' skills of classifying, comparing, evaluating, connecting, and making use of feedback data. | P, T, D, R |
| Develop learners' capacities for cognitive, metacognitive and affective self-regulated learning in order to enable independent learning from the feedback in various settings. For example, there are a range of systems that give automatic feedback from spell-checkers to CAS (Computer Algebra System). In addition, develop learners' capabilities with co-regulation and socially shared regulated of learning in order to support collaborative group work in both face-to-face and online settings. | T, D |

| | |
|---|----------|
| <p>Encourage teachers to recognise that students receive formative feedback from a range of sources both inside and outside school. The two implications that may result are: 1) students may look to teachers to resolve tensions created by inconsistent feedback from differing sources; 2) students work may not accurately reflect their capabilities.</p> | <p>T</p> |
|---|----------|

Action Plan

The working group will:

1. Elaborate a scholarly article on “Challenges for formative assessment supported by technologies” by building on this short report and on research from past EDUsummitT and the 2nd edition of the International Handbook for Information Technology in Primary and Secondary Schools (Voogt, Knezek, Christensen, & Lai, 2018) and the work of other thematic working groups.
2. Disseminate outcomes at various research conferences including: OCCE, 2018; SITE, 2018; and the next EDUsummit, 2019.
3. Inform national governments and regional authorities of the findings and recommendations translating this report where appropriate.
4. Disseminate outcomes at teacher conferences and through teacher organisations including: National E-learning Center Conference, 2018 and Australian Council for Computers in Education (ACCE), 2018.

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