kami

Logic Model

ImpactEd Evaluation

Problem

It is extremely challenging for teachers to provide **high quality, differentiated instruction** across different groups in the classroom.[1]

This means that pupils commonly receive the **same learning experience**[2], regardless of their level of academic attainment, their preferences regarding how they best attain, give evidence of their knowledge and receive feedback on their work, as well as any special educational needs they may have.

This challenge is exacerbated by several contextual factors that currently make it difficult for teachers to adopt appropriate solutions for differentiated instruction:

- **'Tech fatigue'** makes teachers and learners reluctant to use 'yet another' tech solution.
- **Budget cuts**[3] put tech solutions out of financial reach for many schools.
- **Teacher workloads** make it hard for teachers to find the time to adequately tailor instruction and feedback.[4]
- **Lack of support and training** for embedding tech solutions.

Inputs / Activites

How does Kami help address this?

Kami provides a **uniquely structured, collaborative digital environment** that:

- Is **easy for teachers to understand** and incorporate into their teaching practice.
- Provides a way for teachers to **transform any kind of content** into an effective, consistent learning workflow.
- Provides **rich annotation features and collaborative learning tools**, which give students a range of ways to represent and improve their knowledge.[5]
- Allows teachers to quickly **provide richer and more targeted feedback** to learners, in a way that suits their learning style.[6]
- Is both **device- and context-agnostic**, accessible to a range of users and school settings.[7]
- **Integrates fully** with a range of digital tools that teachers already use and know.
- Comes with **free, inclusive access to a dedicated training team** to help teachers use and embed Kami in their school.

Intermediate Outcomes

For teachers

- Teachers have a greater understanding of how they can use Kami to **save time**.
- The amount of **time** that teachers spend **planning lessons decreases**.
- Teachers feel better equipped to provide **differentiated instruction and differentiated feedback** to their students.[8]

For students

- Students receive instruction that is **more personal** and more closely tailored to their needs.
- Students receive feedback that is **more timely and more meaningful**, allowing them to improve more quickly.
- Students' **excitement and motivation** around learning increases.[10]
- Students become **more deeply engaged** in learning (e.g. longer duration.)[11]
- Students' learning becomes **more self-directed and collaborative.**[12]

Long-Term Outcomes

- Teachers' **passion** for teaching improves.
- Teachers' ability to provide **richer, more differentiated instruction** to their students improves.[9]

- Students receive a **more satisfying learning experience**.[13]
- Students develop more of a **growth mindset**.[14]
- Students are empowered to become **more independent**, taking **more ownership** of their participation and learning.[15]
- **Disparities** in formative indicators of learning between students at different levels of disadvantage **become smaller**.[16]

Overall Aim

As a result of using Kami, providing differentiated instruction and effective feedback becomes easier and does not place undue burden on teachers.

This means that all students have access to media-rich, engaging, fulfilling learning experiences, irrespective of aptitude, physical classroom context, language context or other circumstances.

All page references refer to ImpactEd Evaluation's Rapid Literature Review for Kami. A full version is provided in Appendix A1.

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Appendices

A1. Rapid Literature Review for Kami

This document is designed to provide insight into the following areas to guide Kami and ImpactEd's Logic Model workshop at the end of:

- Part 1: Key contemporary global challenges in education
- Part 2: Kami's key features and relevant evidence in literature: Role of annotation in learning
  - Role of annotation in learning
  - Role of formative assessment in learning
  - Role of collaboration in learning
  - Role of accessibility in learning
  - Role of personalised learning
- Appendix: A brief outline of the methodology

Part 1: Key contemporary global challenges in education

To make the outputs of our evaluation as applicable as possible to the education sector, we want to ensure that Kami's evaluation design is informed by the current global challenges in education. To this end, we have conducted a rapid literature review identifying these key problems faced by schools worldwide. Ahead of the Logic Model workshop, Kami will be able to help us identify how features of Kami App begin to address these issues and ultimately lead towards more positive outcomes for a range of pupils and students across the sector. This mapping exercise will allow us to design an evaluation whose desired outcomes address issues that school staff members can relate to.

Budgets and funding

There is clear evidence there has been funding cuts and budget squeezes across education globally. According to the Institute for Fiscal Studies, school spending per pupil in England has fallen by 9% in real terms between 2009/10 and 2019/20, the largest cut in over 40 years. Education budgets globally have been further squeezed as a result of Covid-19 and rising energy costs. Whilst in the US, Congressional Republicans are pushing for a legislation that would result in a 22% cut in schools with low-income students and students with disabilities, which could force a workforce reduction of up to 108,000 teachers, aides or other key staff.

Unsurprisingly, cuts in education funding have severe consequences for pupil outcomes. Tighter budgets means being able to afford fewer teachers which have a direct impact on pupils' learning. Fewer teachers result in larger classroom sizes and, in turn, a decrease in personalisation of learning.

Tighter budgets also lead to a reduction in the number of extra- curricular activities, shortened school hours, a narrowed school curriculum and a reduction in SEND support.

Socio-economic differences

Another key global issue that schools are facing is that a pupil's socio-economic status continues to play an influential role in their success at school (EPI). The general trend is that pupils from wealthy backgrounds achieve better results than their less affluent peers (Ballard Brief). Some recent research suggests that the level of inequality has not been addressed, continuing unchanged (EPI, Ballard Brief), and some research suggests that educational inequality has actually widened (TES). In the UK, some research indicates that although some progress had been made in narrowing this gap, Covid-19 has reversed this progress and that it will take another 10 years to return to pre-pandemic levels of inequality (House of Commons Committee of Public Accounts).

Social and emotional learning

The final key problem is the worrying trend of pupils experiencing poor mental and emotional health (KFF). The literature highlights that although poor mental and emotional health may have been exacerbated by Covid-19 (KFF, U.S. Department of Education, NCES), research by WHO and UNICEF indicates that poor mental wellbeing among students was, in fact, already a severe problem well before the pandemic (European Commission). In the UK, survey results from the National Health Service indicated that there had been an increase from 11.6% to 17.8% of 5-16 year olds being identified as having probable mental health problems (NHS). There is some hope, however, following the UK government's report of the state of schools in 2022 claiming that mental health levels are back to pre-pandemic levels but that anxiety levels are higher than the previous year (UK Government).

Part 2: Kami's key features and relevant evidence in literature

We have conducted a rapid literature review on the role of the following features of Kami App: annotation, formative assessment, collaboration, accessibility, and personalised learning. Although we discuss each feature separately, it is important to note that there is interplay across various features. For example: annotation can facilitate collaboration, formative assessment can facilitate collaboration and personalised learning, and personalised learning can facilitate accessibility. In the table below, we present some emerging findings from the rapid literature review.

Functionality	Emerging Themes

Annotation
 	
Link to issues:
 	
Annotation sharing (and knowledge sharing) could be beneficial in addressing the inequality in academic achievement between wealthier pupils and less affluent peers.
	• Annotation had a positive impact on a wide range of pupil outcomes such as learning achievement (Hwang et al., 2015; Su et al., 2015; Shadiev et al., 2015), approach to reading (Porter-O'Donnell, 2004; Zywica et al., 2008) and learning vocabulary (Xu, 2010; Akbulut, 2007), a range of meta-cognition outcomes (Porter-O'Donnell, 2004; Zywica et al., 2008; Akbulut, 2007), and collaboration among peers (Hwang et al., 2015).
	• However, annotation does not always increase achievement in reading comprehension (Akbulut, 2007).
	• The quantity of pupil annotations (Su et al., 2015; Hwang et al., 2015), as well as the frequency of pupils reviewing their own annotations (Su et al., 2015), were both good predictors for learning achievement.
	  • Lai et al. claims that multimedia environments that provide annotations are most effective because perhaps students can select annotations that fit their needs (Lai et al., 2011).
	• Annotations were also found to facilitate collaboration.
	  • Pupils found annotating other pupils' homework solutions beneficial (Su et al., 2015).
	  • Lower-achieving learners reinforced their learning by reading higher-achieving learners' annotations (Hwang et al., 2015).
	• Another apparent theme was the positive implication of annotations on pupils' reading:
	  • Annotation made pupils realise that reading is a process, forces them to slow down, prevents skimming, and makes them more active in their reading (Porter-O'Donnell, 2004; Zywica et al., 2008).
	• Annotation seemed particularly beneficial to learning new vocabulary, making pupils reflect more on what they'd read (Xu, 2010; Akbulut, 2007), as well as helping pupils visualise in their learning (Zywica et al., 2008) .
	• Finally, one key theme of the impact of annotations on pupils is that it helped pupils in their independence (Zywica et al., 2008) and made them feel more positive about their learning (Akbulut, 2007). It did not, however, have an impact on their cognitive load (Lin et al., 2016).

Formative assessment

Link to issues:

Formative assessment could have a positive impact both on improving outcomes for less affluent pupils as well as improving pupil's social and emotional learning.

- Formative assessment is a powerful way to influence and improve student learning and achievement (Mirriahi et al., 2016; Shih et al., 2012; Cauley et al., 2010; Baron, 2016; Clark, 2012; Spector et al., 2016), as well as positively impact a range of non-cognitive outcomes (Mirriahi et al., 2016; Nolen, 2011, Vassilakis, 2009/2010, Cauley et al., 2010; Clark, 2012).
- Formative assessments facilitate students sharing their knowledge with each other (Vassilakis, 2009/2010).
- Formative assessment also facilitates personalised learning (Shih et al., 2012; Spector et al., 2016) as the teacher can use outputs from formative assessments to improve their instruction (Cauley et al., 2010; Volante et al., 2011).
- There is a large body of evidence on the positive impact that formative assessment has on pupil motivation (Mirriahi et al., 2016; Nolen, 2011; Cauley et al., 2010; Vassilakis, 2009/2010; Clark, 2012). It also seems to have some positive benefits on pupils' persistence (Nolen, 2011) and engagement (Vassilakis, 2009/2010).

Collaboration in learning

Link to issues:

Collaboration could also have a positive impact on reducing inequality between disadvantaged pupils and their peers.

- There is some indication that cross-peer collaboration can improve student learning (Hwang et al., 2015; Smith, 2019).
  - As mentioned above, sharing annotations between pupils, and annotating other pupils' homework is seen as beneficial (Hwang et al., 2015).
- The impact of collaboration on pupil learning seems to be highly context dependent and is likely to vary from student to student (Kuo et al., 2015; Chen et al., 2015).
- Collaboration seemed to increase pupils' motivation (Smith, 2019).
- Collaboration seems to be effective because students with higher-quality work were proud to guide other students, and students with lower-quality work were proud to contribute to higher-quality work (Vassilakis, 2009/2010).
- Staff seemed to struggle to incorporate tech-based collaboration in their teaching (Wardlow et al., 2015).

Accessibility in learning

Link to issues:

With restricted budgets having a negative impact on support available to pupils with SEND needs, it's clear that successfully accessible EdTech products could help plug this gap.

- The literature indicates that technology has made education more accessible in some ways (Traphagan et al., 2010) using technology has also created new blockers around accessibility (Fichten et al., 2019; Hollins et al., 2013; Chu, 2014) and that more work needs to be done to address these newly formed gaps (Kumar et al., 2016) .
- Some key issues around technology and accessibility were:
  - The benefits of using mobile devices be outweighed by their capacity to distract some users (Hollins et al., 2013) .
  - The problems posed by the widespread use of PDFs, since these files are often not readable by screen-reading software (Fichten et al., 2019).

	• The problems posed by using videoclips without captioning (Fichten et al., 2019). • Learning Management Systems often are not capable of increasing the time allowed to complete a specific task for users who are usually permitted to have extra time in educational activities (Fichten et al., 2019). • The combination of digital (e.g., device-based) and non-digital (e.g., real-world based) learning can create a high level of cognitive load for students (Chu, 2014). • One solution for increasing readability of websites is by utilising highly contrasting colours (Bray et al., 2007).
Personalised learning *Link to issues:* *The level of personalisation granted by an EdTech product may resolve the implications of a teacher having limited time to spend on each pupil, an issue derived from budget cuts.*	• In the literature, that there is still a need to define personalised learning before investigating its impact (Hartley, 2007; Lee et al., 2018). Some authors view the concept as incoherent (Hartley, 2007). Others state that personalised learning can be characterised as follows: learning analytics recorded while students interact with a learning system, and these are used in a predictive algorithm to suggest next learning task based on individual students' data (Bienkowski et al., 2012). • Personalised learning appears to produce learning gains for pupils (Chen et al., 2021). The literature shows that in specific subjects, such as mathematics, using a digital personalised learning is better than a more traditional paper and pen approach (Shih et al., 2012). • Personalised learning is useful in giving teachers insight and overview of their pupil cohort. It can help teachers identify pupils at risk (Sharples, 2019) as well as identify the contextual factors involves (Herodotou, et al., 2019). • Personalised learning can help to create accessible and robust learning profiles (Spector et al., 2016) as well as meeting the needs of everyone (Rienties et al., 2019) because it gives students the choice as to how they can most effectively learn (Lai et al., 2011) . • There's some evidence around how personalised learning can improve pupils' engagement, self-efficacy, and confidence (Chen et al., 2021). • There are suggestions that for personalised learning to be effective it needs to be designed based on learning theories (Zhou et al., 2018) and that it needs to integrate recordkeeping, planning, instruction, and assessment (Lee et al., 2018). • There are some broader concerns that personalised learning is another off shoot of the marketisation of education (Hartley, 2007; Hartley, 2008) and that this type of learning will privilege the middle classes (Hartley, 2008).

Methodology

Part 1: Key contemporary global challenges in education

1. Key phrases were searched in Google, both from UK and US region, to identify key issues being faced by schools.
    a. (Those scanned articles are collected here: ICG, My Tutor, The Ed Advocate, EduStaff, Education Inspection, The Guardian, Cambridge University, Aim A Litte Higher, London Councils, and Our World in Data.)

2. Once key themes were identified, key phrases focusing on key themes identified in previous search were search on Google (Budget and funding, Socio-economic differences, and social and emotional learning.)
3. A range of sources was then collected for each key theme and conducted a thematic analysis drawing out what kind of impact these challenges were having on pupils.

Part 2: Kami's key features and relevant evidence in literature

1. For each key functionality that Kami wanted to investigate, using key phrases (e.g., impact of annotation on pupils' learning), we searched the JSTOR database and Google Scholar for relevant articles.
2. Articles were selected on the basis of their relevance to the search terms, and their influence (number of citations).
3. Key findings were noted for each relevant paper for each functionality.
4. A thematic analysis was conducted on key findings for each functionality and written up.