



Integrating Adaptive Learning and Classroom Learning: A Single Case Study on Technology Onboarding

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Abstract

The burgeoning interest in Artificial Intelligence for education (AIED) has manifested in multiple forms across different education systems in various parts of the world. This can range from use of data analytics, automated assessment, and adaptive learning platforms to the adoption of ChatGPT by teachers and students. This research presentation takes a deep dive into a Singaporean classroom to closely examine a teacher's attempt to integrate an adaptive learning platform in his English Language classroom, focusing on his efforts at technology onboarding. Students' responses to both the adaptive learning platform and their teacher's onboarding efforts will also be discussed. This research is motivated by a real-world concern of the increasing dollar investment on adaptive learning platforms despite the lack of a conclusive evidence base [1]. It is also in response to a gap in current understanding on how to introduce and integrate adaptive learning platforms with classroom learning. Preliminary results show that a teacher's best onboarding effort is a necessary but insufficient condition for sustaining students' use of adaptive learning platforms. Systemic factors such as school learning culture and home environment also exert a strong influence in shaping students' learning choices and behaviours. Furthermore, this case study provides a snapshot of students' learning outside of school and offers a glimpse of possible factors that shape students' attitudes and use of an adaptive learning platform. This study marks a critical first step in expanding current discourse on adaptive learning, which appears to focus on the development as opposed to the use effective adaptive learning platforms [2]. It seeks to invite critical discussion on the optimal integration of such platforms with current school systems and the development of effective pedagogies that support the use of these platforms for classroom learning.

Keywords: *Artificial Intelligence in Education, Adaptive Learning, Technology Integration, Teacher Learning, Student Agency*

1. Introduction

Advancements in artificial intelligence, chatbots, social messaging and Internet of Things (IoT) have brought the world from the Information Age into the Experience Age [3]. Coupled with ubiquitous use and ownership of mobile computing devices, hyper-individualised experiences such as streaming service Netflix adapting its offerings based on users' viewing history can increasingly be observed [4]. We need to be prepared that as technology advances and hyper-individualised experiences permeate more aspects of our life, society may also come to expect learning to become personalised. Interestingly, this budding interest in personalised learning appears to be closely associated with the burgeoning popularity of adaptive learning systems [5].

2. Adaptive Learning Systems

Adaptive learning systems (ALS) promise to meet the distinct learning needs of every learner [6], by using data about each learner stored in an individual learner model to deliver personalised learning at scale [7]. These systems claim to put students at the centre of both learning design and the learning process [8]; and are often touted as systems that 'understand' where students are and 'do' what it takes for these students to progress to where they need to be, with assessment being a vital part of the learning process [9].

Commonly cited advantages of ALS include system affordances to dynamically adjust the path and pace of learning in real-time based on students' needs and preferences [10][11], provide students who fall behind with multiple options to get back on track [12][13][14] and offer timely feedback as students make progress at their own pace to achieve competency [15][16]. While the jury is still out on the effectiveness of ALS, some research studies have shown that adaptive learning systems do live up to expectations, reporting significant learning gains for students who used such systems [2].



To fully benefit from the use of ALS, we not only need research on ALS design and development, which is important for ensuring the usability and utility of these systems, it is also critical that attention is paid to how ALS would be used, particularly by teachers. This is of pertinence given that ALS, like most educational technology tools, will be situated within learning contexts, such as classrooms, which are part of the larger learning ecosystem, whose elements (including people, places, activities, and artefacts) are dynamically interacting with each other [17] and influencing learning.

Viewed in this light, it becomes evident that the introduction of ALS does more than add a new technological tool to the classroom; it is likely to create a ripple effect, resulting in modifications to existing interactions among the different elements in the classroom and bring some form of disruption to the classroom system. That said, before we can understand the introduction of ALS can affect classroom learning, we need to first examine how ALS is introduced, namely the ALS onboarding process and do so vis-à-vis the other elements in the classroom environment.

3. Technology Onboarding

Onboarding is a term frequently used by Human Resource practitioners and researchers to refer to a process of organisational socialisation “designed to ease the movement of employees through the organizational threshold to become productive contributors and team members in the least possible time” [18]. Technology onboarding (also known as software onboarding and software training), is an aspect of employee onboarding that focuses on ensuring new hires are equipped with the necessarily knowledge to use the organisation’s technology to effectively perform their role responsibilities and become productive members of the team. It is a multifaceted process that could involve access to technology and related documentation, provision of training resources, availability of coaching and mentorship, as well as opportunity for feedback.

Technology onboarding is increasingly appropriated and used by tech developers to mean something similar but intended for new customers instead of new employees. For example, Scoro, a software company defined technology onboarding as a journey that “a customer go through in between making the decision that you want to use new software, and being a fully set up user of this software, knowing exactly how to extract the most value from the new tools” [19]. Building on this current understanding, ALS onboarding in this paper refers to the process of ensuring that students, who are new users of the selected ALS, understand (i) what an ALS is, (ii) why they are using an ALS and (ii) how they should be making use of the ALS.

4. Methods

In this paper we will present a case study where we examined initial teacher effort and student response to the introduction of an ALS in support classroom learning. A case study approach was adopted as the use of ALS for mainstream education is still in its early days and there remains much that we need to learn about how teachers and students respond to the integration of ALS and classroom learning. Under such circumstances, this study leverages the “epistemology of the particular” [20] by drawing upon classroom observation data, teacher interview and student interview data and ALS log data to illuminate the ALS onboarding experience from the perspectives of both the teacher and the students.

One English language teacher teaching Secondary One students (12- to 13-year-olds) in a Singapore school participated in this research. The ALS onboarding lesson that he conducted was video recorded and he was also interviewed twice during the research process, for his views on the ALS and his design and enactment of the onboarding lesson. Six students from his class of 29 students were interviewed for their reactions to the ALS and their experience of the onboarding lesson. These qualitative data were triangulated with quantitative usage data downloaded from the ALS, for a more holistic view of both the teacher and students’ initial reactions to the ALS.

5. Findings

5.1. Teachers’ ALS Onboarding Efforts

By the teacher’s design, the ALS onboarding process spanned three weeks, including the last two weeks of the first term of school and the one-week term break. This duration was determined by the teacher based on his anticipation of how long students would likely take to become familiar with



the ALS. During this period, students were expected to use the ALS three times a week for 30 minutes per login session. To ensure that students were able to access the ALS on their own at home, the teacher conducted an onboarding lesson where students had time to login and try using the ALS in class.

To the teacher, the onboarding process was more than the distribution of login credentials and giving students time to use the ALS in class. He allocated approximately 28% (115 minutes) of the total available instruction time during this period to acquaint students with the specific ALS as well as more broadly what ALS were and how they would help students in their learning.

Prior to the onboarding lesson, he introduced the concept of adaptive learning to students, explaining how such a mode of learning would be beneficial to them. During the onboarding lesson, the teacher mobilised students' real-world experience by sharing and asking students to share their reading challenges. He also made the ALS relevant to students' learning by explaining how it was designed to help them improve their reading skills and overcome their reading challenges.

The teacher's goal was to ensure that students not only knew what they were supposed to do with the ALS but also why they were using it. He took time and effort to explain the tool to students, the rationale for introducing this tool and the potential benefits it could bring to the students. He also dealt with students' login issues to ensure that they could access the ALS at home when he was not with them. Based on these described efforts, it can be said that the teacher has been quite comprehensive in onboarding students to the ALS.

5.2. Students' Response to the ALS Onboarding Experience and the ALS

During the ALS onboarding lesson, eight students completed the initial diagnostic assessment and started on their daily assignments with the ALS. The rest of the students had to complete this in their own time at home. However, during this first week of ALS onboarding, only three students logged into the ALS again after the onboarding lesson. The duration of their use ranged from one minute to 16 minutes. No student logged in for at least 30 minutes and thus none met the minimum usage requirement (in terms of duration) set by the teacher.

In the second week of the onboarding, the teacher devoted another 35-minute lesson to ALS use, where students brought their mobile devices (e.g., laptops or tablets) to class and worked on the ALS independently. This was to ensure that all the initial login issues were indeed resolved. This also meant that all students used the ALS during the second week of onboarding. However, if we were to disregard this 'spike', only 14 students used the ALS during their free time that week, with three students logging in three or more times in that week. However, no student fully met the usage requirement as none used the ALS for at least 30 minutes.

The third week of the onboarding was term break where students had no school. It was observed that, compared to the last 2 weeks, on average, more students were logging into the ALS. The average amount of time spent was also longer. During this week, a total of 16 students logged into the ALS, of which five students used the platform for at least 30 minutes once. Two login spikes were also observed this week. The first coincided with the teacher's WhatsApp reminder to use the ALS and the other was on the eve of students' return to school.

Fig. 1 Students' Use of ALS During Onboarding

ALS Onboarding	No. of students who used ALS		
	Outside of school	Outside of school for at least 30 minutes	Outside of school for at least 3 times a week
Week 1	3	0	0
Week 2	14	2	3
Week 3	16	5	2

Over the course of the 3-week onboarding, both the number of students using the ALS and the duration of use per week appeared to be increasing (Fig. 1), suggesting some student uptake. However, it remained a cause for concern that six students never used the ALS outside of school, and one student logged into the ALS for less than one minute. Furthermore, only one student met the usage requirement set by the teacher once, and that was during term break. Overall, it seemed to suggest that students were not incorporating the ALS into their learning routine.



6. Discussion and Conclusion

By the end of the ALS onboarding, there remained close to a quarter of students who made little to no use of the ALS. Given that this was not due to login or other logistical issues that the teacher had earlier addressed in school, it raised the question as to why students were not using the ALS. Interviews with six students from the class revealed a few reasons for their lack of interest. Firstly, students were aware that this was an add-on to their learning and as such they prioritised doing homework, and only logged into the ALS whenever they had spare time and energy. However, they also reported spending long hours in school which typically left them with little to no energy after completing their homework.

Secondly students were choosing their learning activities based on their perception as to how quickly any activity would improve their grade for the next test. The student interviewees shared that while they recognised the benefits of learning with an ALS, it would “take too long” and did not seem helpful to their immediate goal of improving their test scores. This was despite the teacher’s efforts to draw links between use of ALS and improving student learning outcomes. It would appear from this that the teacher held a relatively longer-term view of learning while students’ view of learning was more immediate term.

The student interviewees also shared that they did not wish to or were unable to devote all the free time to learning. Some of these students had to spend a portion of their time taking care of younger siblings while their parents were at work, while others valued family time and often had to take time off learning to attend family events or spend time with their immediate and extended family.

Collectively, these preliminary findings reveal that students’ learning choices and behaviours were influenced by a myriad of factors both inside and outside of school, and some of which the school might have no control over. The findings also suggest that intentions to introduce a new tool or mode of learning such as the ALS would require a careful consideration of these factors, particularly if the intention is for students to engage in learning with ALS outside of school, on their own.

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