

*Education Workforce Initiative:
Country Report*

High Touch High Tech Learning
Vietnam

The Need

To meet the goals of its Socio-Economic Development Plan, Vietnam requires more graduates with science, technology, engineering, and math (STEM) and other highly developed skills. While Vietnam has improved its education system and performed well on the PISA assessment, it still faces challenges in educating students for the future STEM workforce. There is a shortage of STEM teachers; a focus on teaching theory; an imbalance of females choosing to study STEM; and a lack of STEM facilities at schools.

Recognizing these challenges, in 2017 Prime Minister Nguyen Xuan Phuc called for a focus on human resource and talent development to leverage the opportunities of the Fourth Industrial Revolution. This included a directive to the Ministry of Education and Training (MOET) to develop new approaches to improve STEM education in junior and high schools. This has encouraged investment in learning experiences that enhance STEM and 21st century skills like problem solving, creative thinking, and adaptability.



Project Overview

The aim of the project was to understand the impact of a High Touch High Tech approach to grade 7 math, and consider implications for the role of the teacher and other members of the workforce when leveraging technology.

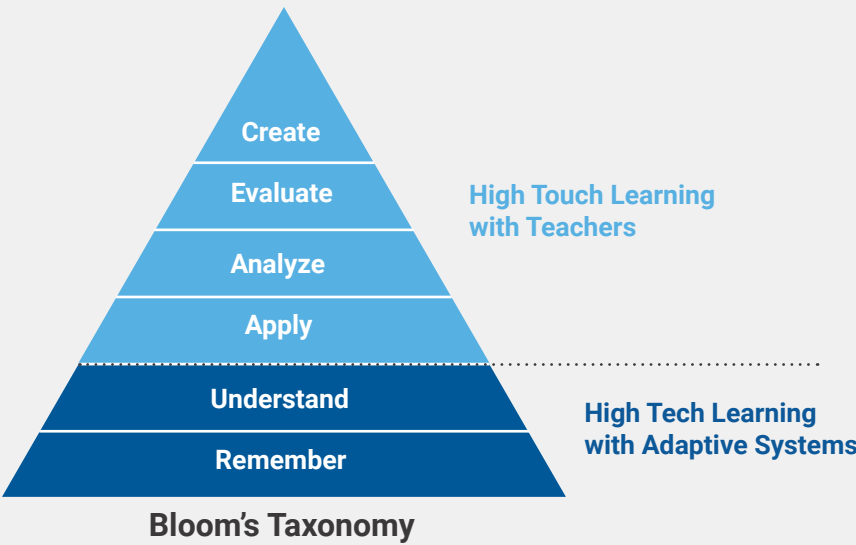
In schools across the globe, new technologies and pedagogies are changing our understanding of what learning is and where it takes place. The role of teachers is being reimagined and exploring how we can leverage these trends for improved teaching and student outcomes has become imperative.

Between March 2019 and March 2020, the Education Commission’s Education Workforce Initiative (EWI) funded by the UK government’s Department for International Development (DFID), partnered with Arizona State University (ASU) and MOET to support improved STEM education.

Inspired by the idea of a High Touch High Tech approach used at ASU (see Box), EWI and ASU designed an adaptive and active learning prototype program for 7th grade math, which is where many students often struggle and lose interest in STEM due to difficulty mastering math skills. The prototype utilized an adaptive instructional system to help students develop math skills mastery and prepare them for solving higher order problems with the guidance of their teacher through active learning. It was tested in four junior high schools – two in Hanoi and two in Ho Chi Minh City – and evaluated alongside three additional comparison schools. The independent evaluation was led by researchers from the Korea Advanced Institute of Science and Technology, Seoul National University, the University of Illinois, and Yonsei University.

Box - A High Touch High Tech (HTHT) Learning Approach

Students bring wide-ranging levels of prior knowledge into the classroom and most teachers struggle to close this learning gap. High Touch High Tech learning aims to address this by providing personalized learning opportunities to students by using adaptive software ('high tech') to tailor instruction to each student’s learning level allowing them to



progress at their own rate. Teachers use data from the adaptive system to provide more targeted support to students. Using adaptive software to support teaching foundational knowledge and enable students to accelerate at their own speed can give teachers more time to focus on individualized instruction and active learning experiences ('high touch') through project-based activities, discussions, and hands-on experiences that nurture higher-order skills such as complex problem-solving and socio-behavioral skills.



Designing a HTHT prototype for 7th grade math

Getting stakeholders on board. The project involved leadership at all levels – national, municipal, district and school – during the design and implementation. At the national level, a dedicated MOET staff member was assigned to ensure communication and buy-in throughout the project. Municipal, district officials, school leaders, teachers and teacher training universities were involved in the design of the prototype course and were brought together during

the intervention to share updates and provide feedback on progress. Teachers were trained to communicate the project with colleagues, students and parents.

Mapping MOET math curriculum to the ALEKS adaptive learning system. The McGraw Hill ALEKS (Assessment and Learning in Knowledge Spaces) was selected because of its long track record in adaptive learning systems and prior success at ASU (a 20% gain in student success rate). However the content from this had to be mapped to the Vietnamese math curriculum. ALEKS covered about 75% of the curriculum so teachers were asked to develop a lesson guide for the semester which indicated where traditional teaching would be needed to address gaps in the digital content.



Training teachers to use the HTHT prototype

Initial training and knowledge check. Teachers were trained how to use the ALEKS system using an experiential approach where teachers completed the adaptive math course themselves. This provided both an orientation to the platform and an ‘initial knowledge check’ of teacher subject knowledge to identify where they might need additional support.

Creating additional course content. Teachers, supported by ASU, produced more than 60 videos of digital instruction in Vietnamese and a library of active learning math exercises for students to use in small groups to promote teamwork and problem-solving skills.

Surveys to improve training and support. These were undertaken regularly to understand the relevance and impact of the training and identify any additional support teachers required.



Implementing the prototype in four schools

Teaching and learning using a HTHT approach. Each week students spent two days working in ALEKS with teachers reviewing each student's progress report from the system and helping students while they worked. One day was then spent on applied problem-solving exercises in groups guided by the teacher and another day was set aside for additional instruction and review.

Supporting schools throughout implementation. This included site visits to treatment schools to review implementation progress, work with teachers to troubleshoot issues and obtain feedback, as well as remote support through webinars and an online community of practice. It also included a mid-point professional development workshop for teachers, teaching assistants, local district officials, and professors from the participating teacher training institutes to review progress.



Measuring impact

Evaluation of the High Touch High Tech approach.

A team of researchers from the Korea Advanced Institute of Science and Technology, Yonsei University, the University of Illinois, and Seoul National University conducted an external evaluation of the prototype to examine the effectiveness of the HTHT approach. They hypothesized that this approach would result in improved student outcomes mediated by teachers' knowledge, experience, and

practices of classroom teaching. The evaluation design was approved by MOET and included data collected at baseline and post-intervention from seven schools, four schools receiving the prototype intervention (8 teachers and 531 students) and the remaining three schools receiving normal curriculum (14 teachers and 832 students). Impact on both teaching effectiveness and student achievement was measured.

Participant surveys. Teachers and students shared feedback on their perceptions of and experience with the prototype which informed final conclusions about the value and impact of the prototype.

Results and Impact

The external evaluation measured both teaching effectiveness and student performance across the High Touch High Tech elements of the prototype. Teacher effectiveness measures included teacher self-efficacy and perceptions of the adaptive learning platform, infrastructure, curriculum, student awareness of goals, school environment, and access to technology. Student performance measures included students learning experiences, perceptions of teacher efficacy, personality, and mathematics assessment.

“Adaptive learning is new in Vietnam but I believe that the community of educators who are using this technology in STEM education is growing. And they have their own online forum, assisting each other, discussing good practices, and sharing the materials. I want to join them and see how I can learn from them as well as support them.”

- DOET representative, Vietnam

Teacher Effectiveness



- Results from the teacher surveys show significant gains in teacher perceptions on the utility of adaptive tools to facilitate student learning, with gains of 0.83 standard deviations.
- Teachers reported significant improvement in their personalized teaching practices to drive curriculum, with gains ranging from 0.78 to 1.80 standard deviations.
- Taking into account teachers' access to personalized technology (e.g., their own computer) and years of experience, there were significant improvements in teachers' self-efficacy on student engagement and motivation.

“ALEKS is very powerful. It generates a lot of student data. We can use it not only for evaluating students' performance but also for improving our own teaching practice. I have used only a small amount of student data. But we are excited to work together once we make fuller use of the data. We can do kind of action research and improve our practice from that. ”

- Teacher, Vietnam

“When I was 12, my teachers were gurus. As a Vietnamese saying goes, ‘Without a teacher I dare you to make your way in life.’ Teachers would lecture and we students took as many notes as possible. It was just one-way learning. But now students are much smarter. They question the information and want [their voices] to be heard. We [teachers] can’t know everything. We need to work together, with other teachers, with our own students, to learn together.”

- Teacher, Vietnam

Student Achievement



- **Statistically significant impact on student math learning:** the adaptive and active learning prototype increased treated students’ math test scores by 0.436 standard deviations. The treatment effect comes from both the current 7th grade curriculum and the previous years (5th and 6th grade) but the impact is larger for lower grade test questions, implying that the adaptive nature of the intervention worked efficiently.
- **Greater benefit for lower performing students:** the positive treatment effect comes from both high-performing and low-performing students, but lower performing students are more likely to receive greater impact from the adaptive learning element of the prototype. This is consistent with results from other studies of technology-aided adaptive learning (see Muralidharan et al. 2019).
- **Decrease in negative attitude toward math but no increase in positive attitude toward math:** assuming math attitudes move from negative to positive as student math performance improves, then results are consistent with other findings that lower-performing students benefit more from the adaptive learning and their negative attitudes are more likely to be effected first.
- **Modest increase in student perception of teacher efficacy** in measures of instruction, student engagement and classroom management.

These results reflect substantive improvements in teacher and student outcomes, demonstrating the promise and potential impact of the High Touch High Tech model, which promotes teacher interaction with students (active learning) and shows the value of technology-enhanced individualized instruction (adaptive learning).

All four prototype schools found the HTHT learning approach to be so useful that they continued to use it in their second semester and at least one school wanted to apply it to other grades.



Leveraging technology for teacher training

Numerous webinars for teachers were conducted to prepare them to use ALEKS effectively, give appropriate instruction to students, and manage their class. Every webinar was recorded so teachers could watch offline when needed. A community of practice was also set up on Inscribe - a community-powered support platform- for teachers to share resources, experiences, and discussions about the HTH approach in Vietnam.



Engaging trainee teachers to build learning teams around adaptive and active learning

The project invited final year students from teacher training universities to participate in the teacher training workshops so they could act as teaching assistants for the treatment schools. The trainee teachers were trained to provide in-class support to teachers and students for using ALEKS, assisting with language of instruction (e.g. explaining technical terms in English and Vietnamese), and support-

ing class management. Teachers in the treatment schools valued the teaching assistants highly, especially those who helped reduce the workload of managing large classes with students at many different levels.

“The teaching assistants were very helpful for me to manage the class since it is a big size class with 44 students. They not only helped to explain technical terms and translate English words into Vietnamese, but they also managed different groups of students effectively. I want to have more teaching assistants in the second semester.”

-Teacher, Vietnam

Lessons Learned

Several critical factors contributed to the challenges and success of the prototype.

- **A dedicated Ministry contact** – A MOET staff member was assigned to help guide the project team in managing communication and coordinating the relationship with MOET. This was essential for managing changes in MOET leadership and maintaining continued buy-in.
- **Adaptive software to identify opportunities for teacher professional development** – When teachers undertook the ALEKS initial knowledge check and orientation to the adaptive software, the results identified a wide range of math mastery levels among the 7th grade teachers and highlighted that some teachers should be supported in remediation on specific math skills. While the prototype was not designed to address variation in teacher preparation, it points to future opportunities where adaptive software can be used to both identify and potentially support pre-service teacher training in subject knowledge at scale or teacher training on a new curriculum.
- **Alignment between the adaptive software content and the national curriculum is a key factor in obtaining buy-in** – The ALEKS course content was not 100% aligned to MOET 7th grade math competencies. This made it more difficult to create buy-in with school principals, teachers and parents.

Moving Forward

Given the positive impact this prototype had on learning outcomes and the interest from treatment schools to continue using this approach, consideration needs to be given to how it could be scaled up in Vietnam, especially in rural areas. The elements of the ecosystem need to be better understood, including the Vietnamese education technology supply and business models, enabling infrastructure, human capacity, and education policy and strategy. In the next phase of this work, the Education Commission plans to undertake a feasibility study covering these areas to provide a robust analysis of the opportunities, challenges, costs, and benefits of scaling the High Touch High Tech approach in Vietnam and a proposal for a larger-scale pilot to collect further evidence. Given the broad interest in this approach, the Commission has established a High Touch High Tech initiative to explore the application of this approach in developing country contexts with attention to design, evaluating impact, and effective scaling strategies.



the Education Commission

@educommission
info@educationcommission.org
educationcommission.org