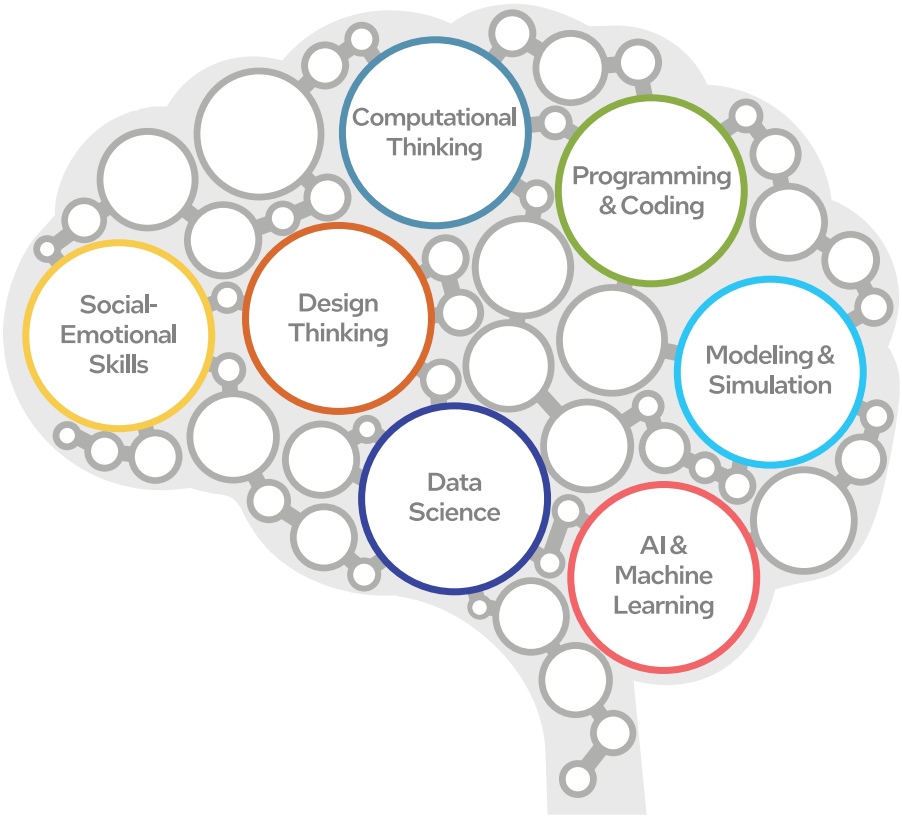

Intel®

Skills for Innovation

Impact Report

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HARVARD GRADUATE SCHOOL OF EDUCATION

Contents

Contents

Executive Summary

About Intel® Skills for Innovation

The Intel® Skills for Innovation (SFI) Program is a comprehensive professional development and classroom support initiative designed to empower educators to integrate future-ready technologies and innovative teaching practices into their instruction. The program aims to equip educators with the necessary mindsets, skill sets, and confidence to design transformative learning experiences, powered by technology, for students. By supporting educators as agents of change, the SFI program plays a key role in transforming education from a passive experience to an active, student-centered one where technology elevates the learning process.

Overview

About the Impact Report

After four years of implementation, it is appropriate to consider the impact of the SFI program on teachers and students, and review the program for the next bound. In this spirit, Intel® engaged a team of researchers made up of faculty and alumni of the Harvard Graduate School of Education to conduct a systematic review of the SFI program.

The SFI program was developed in response to a growing need for digital literacy in today's classrooms. Digital literacy extends beyond mere proficiency in using technology. It involves critical thinking, an understanding of online behavior standards, and awareness of the social issues created by digital technologies. As technology permeates every aspect of our lives, it is essential that our education systems evolve to equip students with the skills needed to thrive in a digital society. However, this evolution is not without its challenges.

Purpose

This report was commissioned to help Intel better understand the effectiveness of the SFI program in terms of preparing educators to integrate technology and innovative teaching practices into their instruction, and for promoting the development of key "future-ready" skills in students.

The report also serves as a demonstration of the impact of SFI to Ministries and institutional customers of Intel, alongside internal and external stakeholders.

Finally, the findings of the report play a crucial role in shaping the evolution of the SFI program in meeting the needs of educators and students as they embrace a new zeitgeist, driven by technology.

Research Questions

This Impact Report focused on three crucial research questions that collectively serve as an evaluation of SFI from its inception, and help to chart the way forward for the future bound of SFI.

1

What is the impact of the SFI program on **educators' confidence, behaviors, and frequency** in using technology for innovative learning?

2

What is the impact of the SFI program on **students' skills development, engagement of learning,** and **future-readiness?**

3

How do educators feel the SFI program could be **refined** and **improved** further?

Methods

The Intel Skills for Innovation Impact Report utilized a mixed-methods approach to collect and analyze data, ensuring a comprehensive understanding of the program's impact on educators and students. This combination of quantitative and qualitative data collection methods provided robust insights into how the SFI program influenced both educators and students.

1. **Teacher and Student Surveys**
   Online surveys were administered to both teachers and students to collect quantitative data on perceptions of the SFI program's impact. The surveys gathered demographic information, details about technology access and use, level of engagement with SFI professional development, perceived impact on teaching practice and student learning, and overall experience with the program. In addition Student Surveys collected students' perspectives on technology skills, engagement in learning, and skill development through participation in SFI lessons.

2. **Focus Group and One-on-One Interviews**
   One focus group and multiple one-on-one interviews were conducted virtually aimed to gather more in-depth qualitative feedback about teachers' experiences with specific SFI resources and professional development opportunities.

Participants

A total of 627 educators and 167 students shared their perspective on how the Intel(R) Skills for Innovation Program impacted teaching and learning in the classroom and enhanced experience through integrated technology. Participants represented 45+ different countries, teaching in various subjects and at different grade bands, and illustrating a diverse range of experiences engaging with technology.

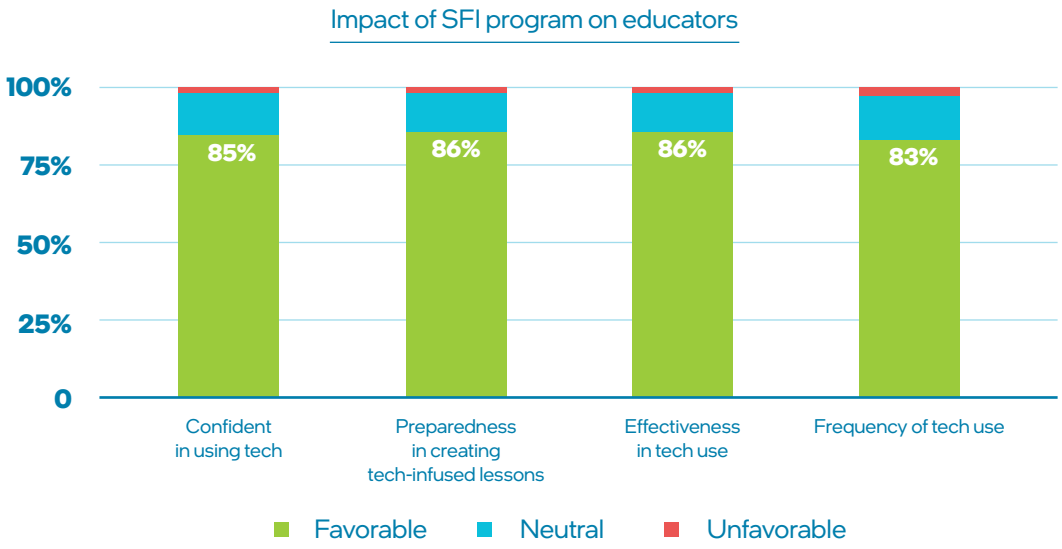
Findings

Research Question 1

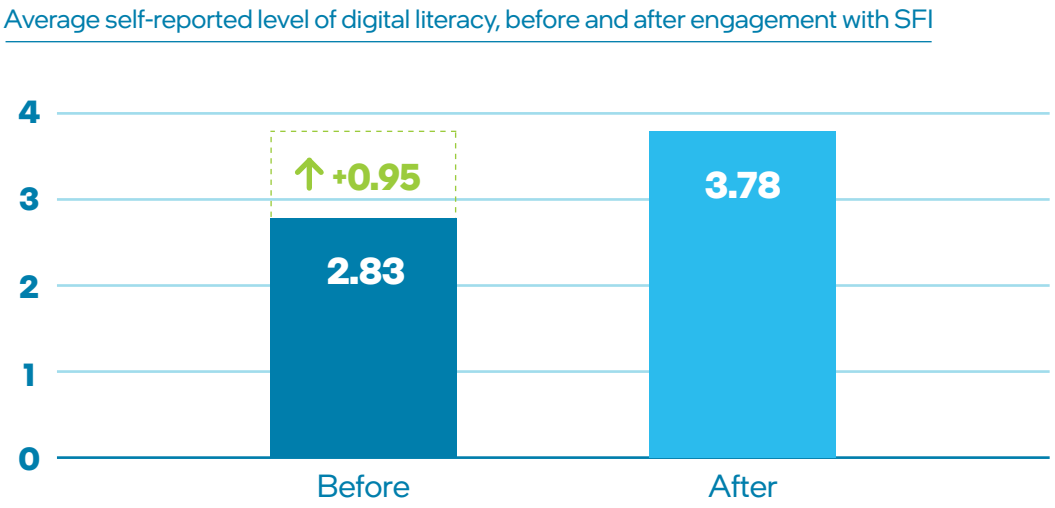
What is the impact of the SFI program on educators' confidence, behaviors, and frequency in using technology for innovative learning?

The Skills for Innovation (SFI) program has had a significant impact on teacher practice, as evidenced by the findings from the mixed-methods study.

SFI Program Impact on Teaching and Learning



1. **Confidence in Using Technology**
   The SFI program has successfully increased educators' confidence in using technology. 85% of the respondents agreed that the SFI program made them more confident in using technology in the classroom, indicating that the program has effectively enhanced teachers' confidence in integrating technology into their teaching practices.



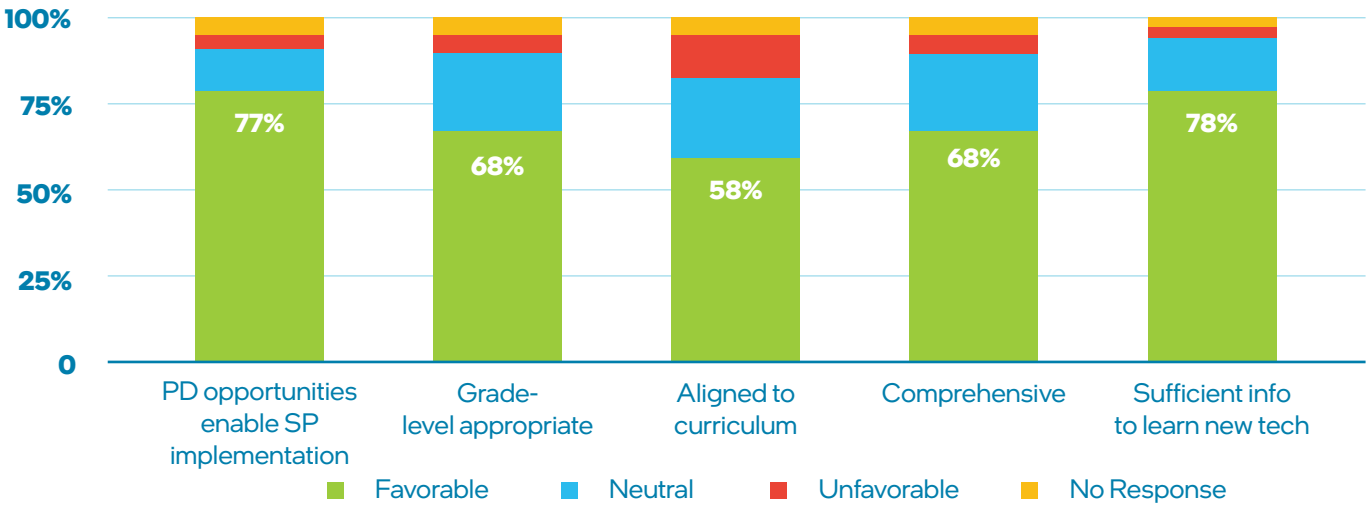
Overall, participants reported a net gain of +0.95 levels across the five levels illustrated on the next page, reflecting a net positive gain in digital literacy before and after engagement with SFI resources. This represents 68% of respondents reporting at least a +1 level increase in their proficiency with technology as a result of SFI.

Level 5	I guide students in adopting innovative mindsets and prepare them for the challenges of the future using technology-infused learning experience.
Level 4	I actively encourage innovation and effectively use technology to create engaging and creative learning experiences.
Level 3	I am comfortable using technology to deliver content and am now focusing on improving the wat I design and lead learning experiences.
Level 2	I am new to using technology in learning an am building my foundational skills.
Level 1	I have little to no exposure using technology in learning.

2. Changes in Teaching Behaviors
86% of respondents reported that the SFI encouraged educators to adopt more innovative and technology-infused methods and the SFI program prepared them to create technology-infused learning experiences for their students. In addition, the program made them more effective in using technology to develop students' innovation skill sets and mindsets.

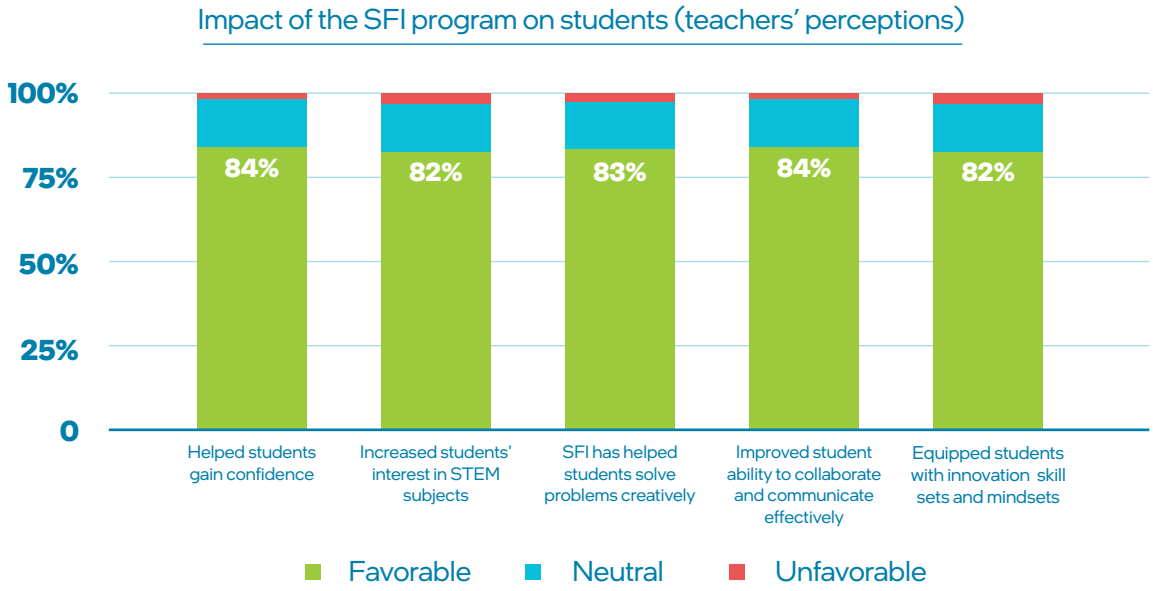
3. Frequency of Technology Use
86% SFI program has led to an increase in the frequency of technology use in teaching after participating in the SFI program. This substantial increase demonstrates that the program enhances educators' confidence and changes their behaviors by consistently applying them in their teaching practices.

Teachers' perceptions of Starter Packs



4. Correlation between device access and confidence
Finally, there was a strong correlation between level of device access (for students) and educators' confidence, behaviors and frequency of technology use, suggesting that educators' levels of engagement with technology is driven by the availability of student devices within their classroom.

Research Question 2
What is the impact of the SFI program on students' skills development, engagement of learning, and future-readiness?



The Skills for Innovation (SFI) program has made significant strides in equipping students with the skills and confidence to engage with technology and develop future-ready skills.

1. **Confidence in Using Technology**
   84% of teacher respondents reported that the SFI program had successfully helped students gain confidence in using technology for learning. Students agree, with 86% declaring that they felt more comfortable using new technologies.

2. **Engagement of Learning**
   92% of student respondents reported that they were more engaged and interested in class activities when they used new technology as part of the SFI program. This has spillover effects on career readiness: 82% of teacher respondents agreed that SFI has been effective in increasing students' interest in STEM subjects and careers,

3. **Skills Development & Future-Readiness**
   Teacher respondents agreed that the SFI program equipped students with the skills needed to thrive in the future, such as innovation skill sets and mindsets (82%), creative problem-solving (83%), and communication skills (84%).

Research Question 3
How do educators feel the SFI program could be refined and improved further?

While the program has been largely successful, educators provided valuable feedback on how it could be refined and improved further including areas that can be improved to further enhance student learning and engagement. Based on the findings from the mixed-methods study, the following recommendations are proposed to refine and improve the SFI program:

- **Enhance and Align Existing Content**
  A segment of educators suggested enhancing the existing content of the SFI program, specifically naming aligning the content more closely with national curriculum standards, translating more Starter Packs into local languages, and providing alternative software suggestions for those featured within Starter Packs making the program more accessible and relevant to a wider range of educators and students. Educators acknowledged that developing additional starter packs focused on less represented areas would offer more opportunities to integrate the SFI program across all subjects and grade levels.

- **Provide Robust Professional Development Opportunities**
  Many teachers expressed the need for more robust and intentional professional development opportunities including offering more hands-on training experiences, providing localized training that explores the concepts covered in greater depth, and developing mentoring and coaching structures to support less experienced teachers.

- **Incorporate Hardware Provisioning and Support**
  Some educators noted the lack of resources to fully implement SFI in the classroom and how addressing issues of device access and quality would ensure implementation of the SFI program more effectively for all students to have the opportunity to benefit from the program. In addition, budget constraints were identified as a significant barrier to implementing the SFI program and consideration should be given to strategic partnerships with technology companies to provide schools with access to affordable devices, software or funding

Recommendations

The Intel Skills for Innovation (SFI) program has demonstrated a significant positive impact on both educators and students, translating into significant student gains in areas such as technology skills, engagement in learning, and perceived future-readiness.

To further enhance the program's impact and reach, the following recommendations are presented:

- **Enhancing Program Content and Resources**
  - Leverage Generative AI for Customization: Utilize generative AI tools to personalize learning experiences for diverse student populations.
  - Expand the Scope of Starter Packs: Develop new Starter Packs for subjects currently underrepresented in the program, such as geography, career and technical education, health, arts, and foreign languages as well as for early learners (Kindergarten to Grade 2).

- **Strengthening Teacher Professional Development**
  - Extend a Teacher Growth Model to complement the SFI Framework: Establish a competency framework for digital literacy and future-ready skills, and implement a data-driven approach to professional development, providing targeted interventions based on teacher needs.
  - Align SFI with School Improvement Plans: Offer dedicated training for school leaders and administrators on integrating SFI into their school improvement plans, and encourage mentoring and coaching structures within the SFI network.
  - Support a Vibrant Teacher Community: Further enhance the SFI platform for educators to share resources and experiences, and incentivize participation in this online community.

- **Addressing Device Access and Infrastructure Challenges**
  - Prioritize Device Provisioning: Invest in providing devices for schools and educators lacking resources, and explore strategic partnerships with device manufacturers to offer subsidized access.
  - Ensure Reliable Infrastructure: Assist schools in enhancing their network infrastructure, and offer ongoing technical support to educators and schools to address any hardware or software issues.

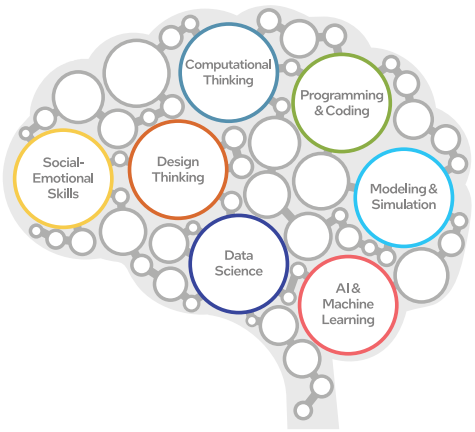
Intel®

Skills for Innovation

Impact Report

Overview of the Intel Skills for Innovation Program

The Intel® Skills for Innovation (SFI) program is a professional development and classroom support initiative aimed at helping educators integrate technology and innovative teaching practices into their instruction. Through hands-on workshops, ongoing coaching support, and curated classroom resources called "Starter Packs," the SFI program equips educators with the mindsets, skill sets, and confidence to design transformative learning experiences for students.



The SFI program promotes the development of key "future-ready" skills in students such as computational thinking, design thinking, collaboration, communication and creativity. These skills are illustrated in the SFI framework which was shared with educators during professional development. The program objectives are to make students more confident users of technology for learning and better prepared to solve problems creatively using technology.

The goals of the SFI program are to develop educators' digital literacy, cultivate design thinking, collaboration, critical thinking, and problem-solving skills in students, engage students by connecting classroom concepts to real-world issues, and prepare students for jobs of the future by exposing them to skills like coding, data science, artificial intelligence, and computational thinking.

Adapter

Level 1: Adapter of Technology

Support educators who are new to technology in building a strong foundation for basic digital fluency through a mix af F2F and supervised, online modules.

Owner

Level 2: Leader of Learning Experiences

Help educators transition from being content experts to becoming effective owners and leaders of learning experience in anywhere learning scenarios.

Catalyst

Level 3: Catalyst of Creative Confidence

Enable educators to reimagine learning experiences with technology to empower students to become confident innovators.

Mentor

Level 4: Mentor of Upgraded Mindsets

Introduce educators to the upgraded mindsets that are essential for students to thrive in the 4th Industrial Revolution and successfully navigate unknowns of tomorrow.

Goal

Achieve student readiness for the 4th Industrial Revoution and Beyond.

The SFI initiative aims to help educators adopt technology to create innovative learning experiences that engage students and build skills needed for the future. The SFI framework provides a four-step process for planning, testing, training, and deploying skills-based learning models across education systems. Below is the path to implementing Intel Skills for Innovation.

By supporting educators as agents of change, the SFI program plays a key role in transforming education from a passive experience to an active, student-centered one where technology elevates the learning process.

Introduction

This study aims to evaluate the impact of the SFI program on educators and K-12 students. As part of the study, over 600 educators teaching a variety of subjects completed an online survey to provide feedback on their experiences with the SFI program. The survey gathered information on educators' level of engagement with SFI professional development opportunities, integration of SFI resources like the Starter Packs into classroom instruction, perceived impact on teaching practice, and overall experience with the program.

Additional qualitative data was collected through focus groups and one-on-one interviews with educators who have implemented multiple SFI lessons. The purpose of this mixed-methods research was to understand how the SFI program influences educators' technology skills and use, as well as students' learning outcomes. Insights from this study can be used to refine the SFI program and further support innovative, technology-infused teaching practices.

This report examines the impact of the SFI professional development program on educators and K-12 students. The SFI program aims to develop future-ready skills in students by providing educators with training and resources to integrate technology and design thinking into their instruction. Through a survey of SFI educators and their students, this study sought to understand the effects of the program on educators' confidence, behaviors and technology use in the classroom, as well as its influence on developing skills, engagement and career readiness in students. The results provide insights into how the SFI program experience impacted both educators and learners, as well as opportunities to further strengthen the initiative. The findings can help guide the continued evolution and impact of the SFI program on developing a generation of innovators.

Purpose of Study

Research Question 1
What is the impact of the SFI program on educators' confidence, behaviors, and frequency in using technology for innovative learning?

Research Question 2
What is the impact of the SFI program on students' skills development, engagement of learning, and future-readiness?

Research Question 3
How do educators feel the SFI program could be refined and improved further?

This study examines the impact of the SFI program on educators and students. It investigates the impact of the SFI program on educators' technology skills and comfort level, confidence levels in using technology for teaching, behaviors around the use of active, project-based, collaborative learning, and frequency of technology use for innovative learning. It also evaluates the impact on students' frequency of technology use, integration of skills like computational thinking, AI and coding into lessons, engagement in learning, and development of skills for future-readiness. Additionally, the quality of technology integration, perceived student engagement and skills development, educator perceptions of barriers to adoption, and impact on teaching practices and lesson planning are assessed. Educator and student outcomes are measured through surveys and interviews to answer the three driving research questions regarding the impact and potential improvements to the SFI program.

Methods Overview

This study utilized a mixed-methods approach, collecting both quantitative and qualitative data to evaluate the impact of the Intel Skills for Innovation program. The primary methods of data collection were online surveys, focus groups, and one-on-one interviews.

Surveys

Online surveys translated in multiple languages were administered to both teachers and students to collect quantitative data on perceptions of the impact of the SFI program. The teacher survey consisted of 22 questions gathering demographic information, details about technology access and use, level of engagement with SFI professional development, perceived impact on teaching practice and student learning, and overall experience with the program. The student survey was shorter at 15 questions and was administered by teachers to gather students' perspectives on technology skills, engagement in learning, and skill development through participation in SFI lessons. The surveys provided valuable insights into perceived changes in behaviors, mindsets, and skills as a result of the SFI program.

Focus Groups & One-on-One Interviews

One focus group was conducted virtually with a total of 2 teachers who had implemented multiple SFI lessons in their classrooms. The focus groups, which lasted 1.5h, aimed to gather more in-depth qualitative feedback about teachers' experiences with specific SFI resources and professional development opportunities. Teachers shared real examples from their teaching practice to illustrate the impact of the program. Individual interviews were also conducted with 8 other teachers to gain a deeper understanding of personal journeys and perspectives. Each 45-minute interview followed a semi-structured protocol to explore challenges, benefits, and potential improvements to the SFI program in more nuanced detail.

This combination of quantitative and qualitative data collection methods through surveys, focus groups, and interviews provided robust insights into how the SFI program influenced both educators and students.

Limitations

While the mixed-methods approach provided valuable insights into the impact of the SFI program, there are some limitations to acknowledge. The study relied heavily on self-reported data from surveys, which is subject to potential biases. Participants may have overestimated or underestimated with no calibrated metrics for digital literacy. They also may have interpreted questions differently or focused more on recent experiences rather than taking a broader view. Self-reported data cannot be independently verified and does not consider a valid comparison of respondents competencies before and after engagement with SFI.

Additionally, using a survey tool to assess digital literacy comes with limitations. Digital literacy is a somewhat subjective concept that can be interpreted differently by individuals. The study was not able to directly observe skills in practice or account for the various contexts in which skills may manifest. There may have been an element of unconscious competence whereby participants did not fully recognize the full extent of their abilities.

The qualitative data from interviews and focus groups provided valuable context, but with a small sample size there are limitations to generalizability. The perspectives captured may not be representative of all participants.

Finally, there is the issue of self-selection bias in that those who opted to complete the survey and participate in interviews/focus groups may differ systematically from non-respondents. This threatens the external validity and generalizability of the findings. While the mixed-methods approach aimed to address some of these limitations, they nevertheless constrain the ability to make definitive claims. The findings provide useful insights but should be interpreted with caution in light of the methodological constraints.

Participant Profiles/Demographics

Study Participants

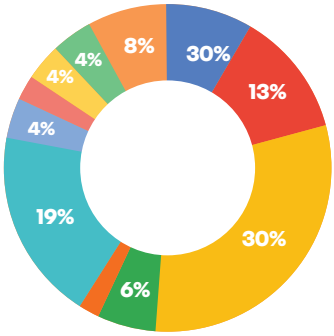
The impact report represents data from survey responses and conversations of 627 teachers and the survey data from 167 students. Participants were invited to participate directly as registered users on the Skills for Innovation platform as well as social media outlets with an anonymous survey. Study participants range in their level of engagement consider either participation in SFI Professional Development opportunities or using SFI Starter Packs. The participants represent over 45 countries in elementary, middle, and high school classes teaching all the core disciplines (Math, History, Language Arts, and Science) and a variety of other classes including technology/computer science, career and technical education, geography, and foreign language classes.

In addition, participants represented a diverse group of technology users ranging from educators taking first steps to implement technology in their teaching practices to educators that demonstrate high digital literacy and are innovators and ambassadors for technology-infused teaching and learning. This includes a wide spectrum illustrated relative to access, quality, and availability of resources to fully engage in digital-based learning. Lastly, participants varied in level of engagement in the SFI Program.

Country	Respondents
China	177
South Africa	59
Indonesia	51
USA	17
Argentina	34
Mexico	30
United Arab Emirates	31
Kenya	13
Brazil	12
Ukraine	12
Saudi Arabia	10
Zambia	10

Subject & Grade Level Breakdown

Subjects taught by participants

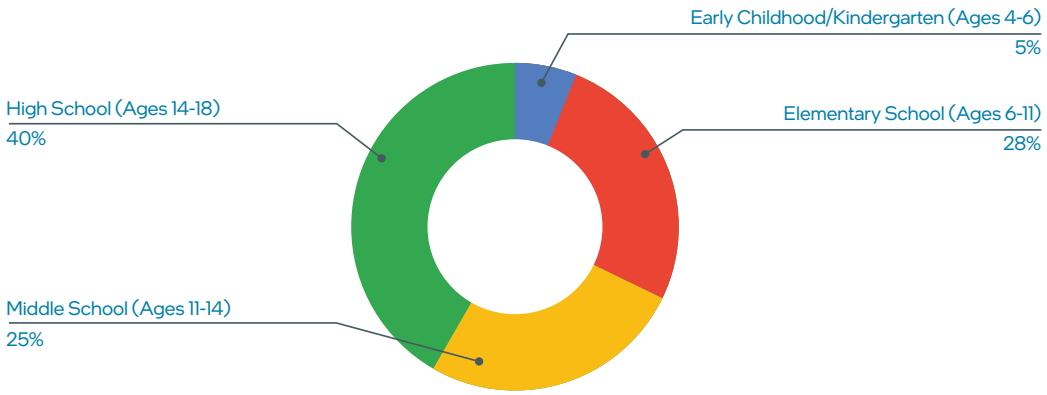


- Science (30%)
- Mathematics (13%)
- Social Studies/History (6%)
- Geography (2%)
- Arts (4%)
- Others (8%)
- Technology/Computer Science (19%)
- Language Arts (9%)
- Career and Technical Education (4%)
- Health (2%)
- Foreign Language (4%)

Note: Percentages in graphs within this Report may not total 100 due to rounding

The majority of teachers who responded teach Science (30%) and Technology/Computer Science (19%). Other commonly taught subjects include Mathematics (13%), and Language Arts (9%). Subjects that were less represented included Geography (2%), Career and Technical Education (4%), Health (2%), Arts (4%), and Foreign Languages (4%).

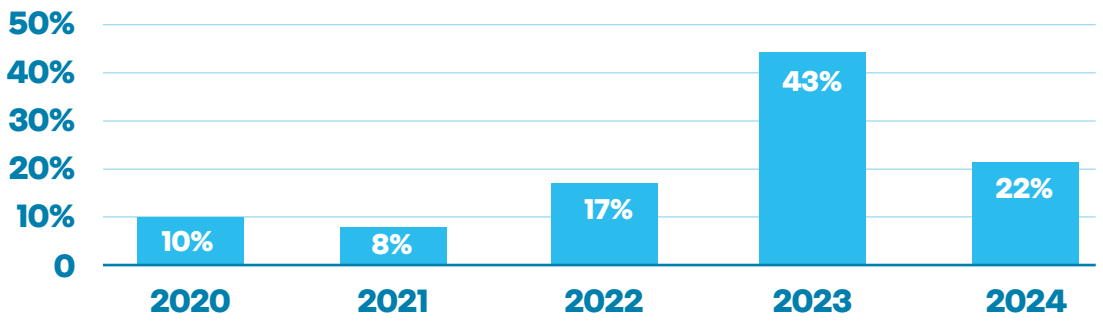
Grade level taught by participants



The majority of teachers who responded teach High School (40%). Fewer teachers reported teaching Middle School (26%) and Elementary School (29%) and very few teaching Early Childhood/Kindergarten (5%). A potential inference for why more teachers of higher grades participated could be that technology integration may be more established in older grade curricula. Younger students may also have less independent access to devices for activities or the preliminary digital skills to access the curriculum.

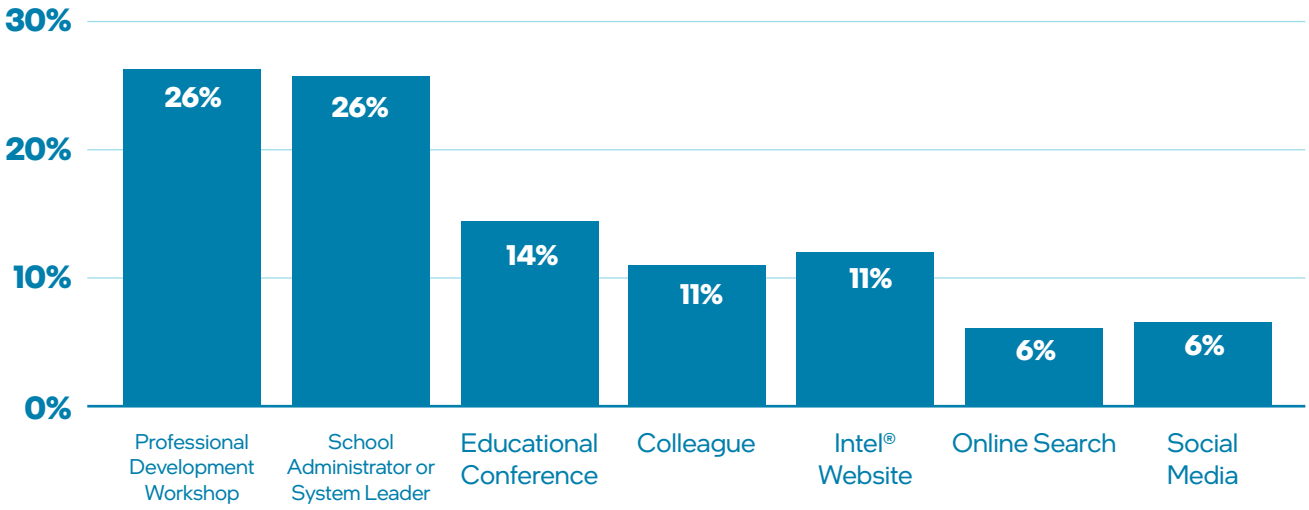
Introduction to SFI

When did you start using SFI?



A majority of educators (43%) indicated just accessing SFI resources within the last 12 months. This outlines both an increase in engagement with SFI resources and inferred need for resources that integrate digital learning in the current curriculum to prepare students for a digital world and access to learning.

How were you introduced to SFI?



For a quarter of teacher respondents (26%), the introduction to the SFI program and the resources to support practice and implementation is done through school and district leaders. This suggests that overall program strategy should focus on introducing SFI to schools via school leaders and decision makers - those that have authority over curriculum, school culture and mission, budget and resources, and expectations for teaching and learning.

A similar proportion of teachers learn about SFI through direct and indirect professional development. This highlights that there is demand from teachers seeking professional development to improve their teaching practice through integration of technology and SFI resources. It also highlights the value of professional learning in supporting teachers to integrate technology in their teaching practice. The study data does not differentiate how Professional Development was introduced to teachers - either through school leaders or teachers seeking individual professional development.

Access to Technology

Access to technology emerged as an important determinant that impacted implementation of SFI resources in the classroom. The category of technology includes both access and quality of devices/hardware and internet/mobile networks as well as preliminary digital teaching and learning competencies impacting the comfort, confidence and understanding of implementing digital learning tools in the curriculum.

The most commonly used devices for classroom activities reported by teachers are personal computers & laptops, smart phones, and iPads/tablets. 69% of teachers stated that personal computers & laptops were used by students, while 36% of teachers reported the use of smartphones for classroom activities, and 34% reported the use of iPads/tablets. This information was confirmed by student respondents - 59% reported that personal computers & laptops were the most commonly used devices in school. Smartphones were represented at a much higher rate (55%) for student respondents compared to teacher respondents, followed by iPads/tablets (19%). The discrepancy between teacher and student perspective on smart phones might be due to smartphone policies and the interpretation of 'using' versus 'allowed to use'.

While Chromebooks fill a similar role as laptops, they are less prevalent in the classroom. Only 11% of teachers reported that their students used Chromebooks, while the corresponding figure for student respondents was 6%.

VR headsets had the lowest reported usage (2%) in the classroom, while the "Other" category accounted for 7% of teacher responses. Teacher respondents cited other devices that are used for learning such as projectors, smartboards, or interactive displays . Students, on the other hand, cited desktop computers (likely in computer labs), audio/visual equipment like projectors and sound systems, and specialized devices like 3D printers and microscopes.

Insights on Student Devices

While personal laptops remain the dominant student device currently, smartphones and Chromebooks show rising use. At the same time, both teacher and student respondents noted limitations in using smartphones for classroom activities, especially in comparison with devices with larger screens like laptops and tablets. In addition, some participants said there were school policies that prohibit the use of smartphones in school.

In contrast, the rising trend of Chromebooks, coupled with their lower cost and the adoption of mobile Chromebook carts could be an opportunity to scale a digital integration initiative for schools with limited budgets. The opportunity to couple specific resources with targeted devices depending on a school's readiness to adopt would prove to be an important strategy to scale the SFI initiative.

Finally, iPads/tablets and VR are emerging but have not overtaken traditional form factors as of this data. With just 2% of teachers citing the use of VR headsets in the classroom, adoption of VR is still low. VR is still an emerging technology and may not be widely available or suitable for many classroom settings.

In summary, the diverse range of devices and digital tools named by respondents highlighted their varied digital literacy levels and experiences, in turn influenced by their access to resources. This spectrum of devices foreshadowed key findings revisited throughout the study:

1. The availability and quality of devices pose significant barriers to digital learning implementation in classrooms,
2. Access to the internet or mobile networks is crucial for enhancing digital literacy, and
3. Disparities in the availability of devices among students often create gaps between teaching digital skills and providing hands-on technology practice opportunities.

Students Comfort and Engagement with Technology Outside of the Classroom

The majority of students (60%) reported using a personal computer or laptop outside of school as well, continuing their dominance in student device usage. Expectedly, significantly more students (79%) use a smartphone outside versus inside school (55%). This suggests smartphones play an even greater role in students' lives when not in educational settings. iPad/tablet use saw a slight increase outside of school (24% vs 19%). Their portability makes them well-suited for flexible usage. VR use also saw a small increase - as the technology becomes more accessible, interest may grow beyond schools. Chromebook use decreased outside school (9% to 6%) - their education focus may limit broader personal adoption. Common "other" devices included gaming consoles (PlayStation, Xbox, etc.), eReaders (Kindle), and music players (iPods). In summary, while laptops remain the top device, smartphones see greatly increased use outside school. Tablets also rise, suggesting their value for flexible personal and educational use. VR and Chromebooks show less adoption beyond classrooms currently.

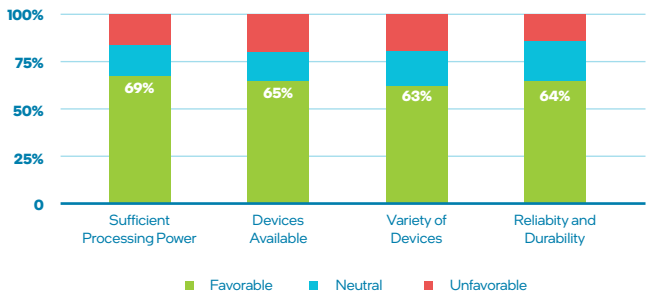
Type of Device Access

The data indicates that the majority (65%) of students access fixed devices in a classroom, lab, or other venue where devices are not brought out of the room. This suggests most activities requiring digital devices occur on shared equipment located within a specific classroom or lab space. The second most common access type is that students are assigned individual devices which they can take home (24%). This allows for more flexible access beyond the classroom and potential continuation of classroom activities at home. Relatively few students (11%) access devices on a cart. Device carts allow for shared devices to be moved between classrooms but present logistical challenges of scheduling and transporting the carts. It seems as if most classroom activities requiring digital devices currently take place on shared, fixed equipment located within classrooms/labs. A smaller portion of students have individual, take-home devices assigned. Device carts providing shared, mobile access are utilized the least based on this data.

Level of Device Access

The data indicates that for the majority of students (69%), devices for classroom activities are either always (34%) or somewhat available (35%), requiring some planning but generally accessible. This suggests a reasonably high level of reliable access to digital resources. The second most common experience is that devices are usually available, but there may be occasional waits or limits during peak times (25%). This level of access is still fairly reliable with only minor constraints. Relatively few students reported devices being seldom available (7%) - the lowest level of access where digital resources are rarely or inconsistently accessible. Overall, this data indicates a high level of availability of digital devices across student experiences based on this sample. For most students, devices seem to be fairly available to support classroom activities when needed, with only limited constraints. Despite occasional waits or the need for some judicious planning ahead, students' access to devices is generally reliable.

Features of Existing Devices that Enable Innovative Learning Activities



69% of teacher respondents felt that their students' devices had **sufficient processing power and memory** to handle innovative learning activities. This indicates the devices have the technical capabilities to support skills like problem-solving and creativity.

However, fewer (65%) felt that there were **sufficient devices** to facilitate innovative activities. This suggests device availability may sometimes limit the types of activities that can be done.

A similar pattern is seen in terms of **device variety** - a majority (63%) felt that students had sufficient variety of devices to explore different approaches, but some felt that variety was lacking, suggesting that greater variety could further innovation.

Reliability and durability also received favorable ratings overall (64%) but with more neutral responses (21%) than other categories. Technical disruptions could impede a focus on learning innovative skills.

While processing power seems sufficient, availability of devices and variety may need to be expanded to fully realize the goals of promoting future-ready, innovative skill sets. Addressing reliability concerns could also help students focus on learning without disruption. The capabilities seem in place but resources may need to grow to consistently facilitate the innovative activities envisioned

Additional Devices and Resources

The most requested additional device was higher performance laptops, with 26% of respondents selecting this option. This suggests that **educators recognize that laptops are a core device for classroom activities**, but students' existing devices may be lacking in capabilities to fully enable innovative learning.

Higher performance PCs (19%) and 3D printers/makerspace equipment (19%) were also popular requests. This indicates a need for more powerful general-use and specialized devices to power creative workloads, and could be influenced by both an engagement with SFI resources and the barriers to full implementation of selected Starter Packs.

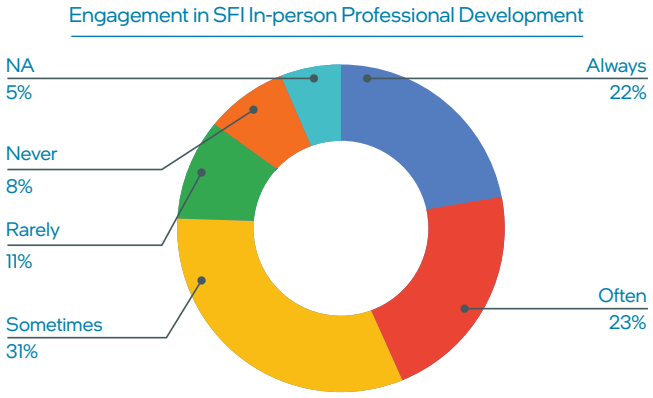
VR/AR headsets were selected by 17% as another valuable emerging technology that could cultivate innovative skills when more widely available. This represents a potential market develop educational tools that leverage students' engagement with VR/AR technology.

A notable 20% of teacher respondents selected "Other", with specific/branded tools, immersive technology, projectors/smartboard, iPads, and the Internet cited as the most common examples of devices that should be upgraded. Within this category, many also mentioned a desire to raise device budgets and quantities, presumably addressing access as well as quality of devices.

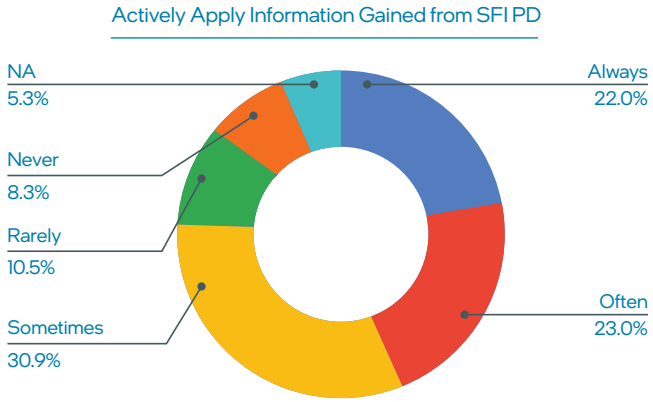
In summary, the top priorities appear to be more powerful general-use laptops and PCs to drive innovative activities, along with specialized equipment like 3D printers and VR/AR tools. For many teachers, their students' current devices may be insufficient to fully realize the goals of the SFI program. Investing in a refresh or expansion of these device categories could better empower educators to develop future-ready skill sets in students.

Engagement with SFI

Professional Development



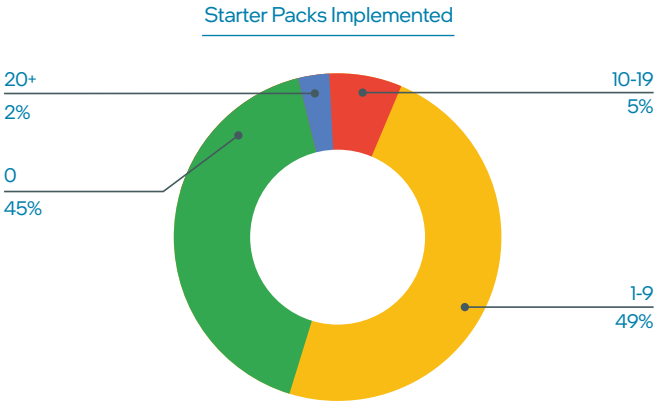
45% of respondents indicate they either always or often attend in-person workshops when available. This suggests in-person workshops are well-attended when offered. However, a significant portion (31%) only attend sometimes, with 19% saying they rarely or never attend. This indicates opportunities for in-person learning may not be accessible or feasible for all educators. Further exploration would be useful to investigate how PD aligns with budget, curriculum, and current technology available.



When it comes to actively applying information from SFI PD, an even higher proportion (60%) say they always or often do so. This positive response communicates that SFI PD is generally effective at imparting guidance to educators which then translates to classroom practice. Very few (10%) report rarely or never applying what they learn, showing PD is largely having its intended impact. The responses suggest educators value SFI learning opportunities and are motivated to integrate new strategies when possible. It is clear that the SFI PD is highly effective and can be leveraged to support teachers implementation of digital learning in the classroom.

In summary, while in-person workshops seem well-utilized, barriers like scheduling may prevent some from attending. However, SFI PD appears to be successful in transferring knowledge that most educators consistently apply in innovative ways in their teaching. Opportunities for both synchronous and asynchronous learning hold promise and should be explored further.

Starter Packs



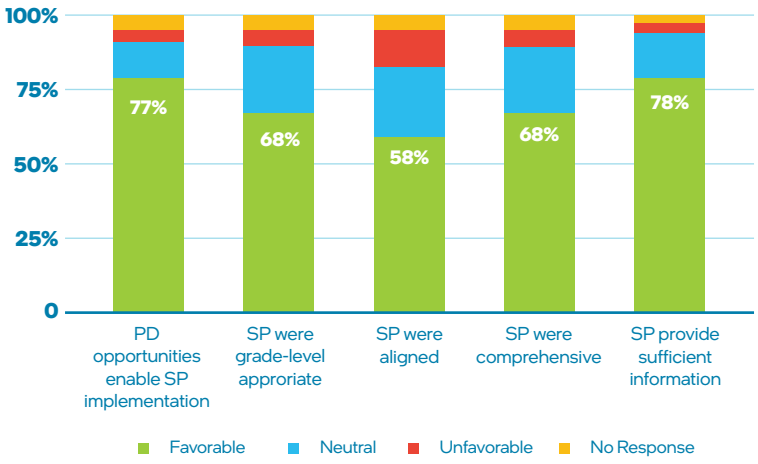
A total of 1734 SFI Starter Packs were implemented across 627 respondents, averaging 2.8 Starter Packs implemented per educator. The total number of Starter Packs implemented shows meaningful adoption of, and engagement with. these resources among educators. This level of implementation suggests the Starter Packs are providing valuable guidance and activities. That the majority (78%) of respondents reported implementing 3 or fewer starter packs indicates that most are at a relatively early stage of integrating multiple Starter Pack themes and lessons into their teaching practice.

The table below illustrates a significant finding and correlation between respondents' use of SFI resources (Starter Packs used in the classroom) and their self-reported role in using technology for learning. There is a positive and direct proportion that showcases increased digital competency in teaching practice with the increased number of Starter Packs used.

Starter Packs Implemented	Self-reporting Increase in Digital Proficiency (avg)
0	0.62
1	0.91
2	1.04
3	1.07
4+	1.17

Integration of Starter Packs

Teachers' perceptions of Starter Packs



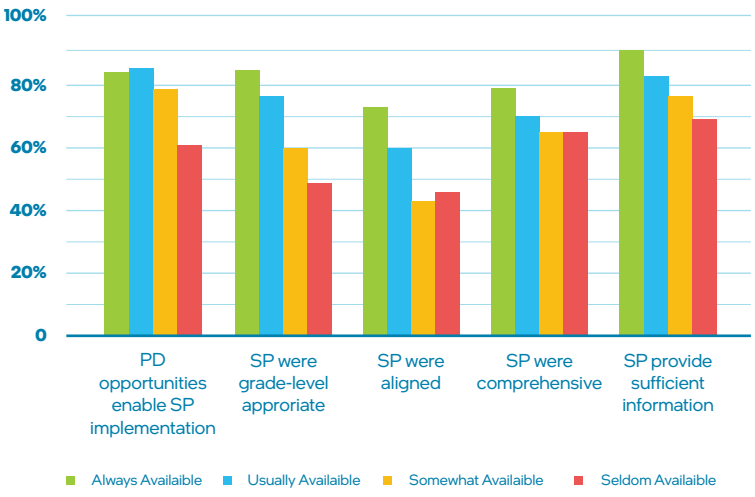
The majority (68%) of participants agreed that the Starter Packs were **grade-level appropriate**, while only 5% disagreed. This shows most participants felt the starter packs were appropriate for their grade level.

While the majority (58%) agreed that the Starter Packs were **aligned with their existing curriculum**, a significant proportion (36%) of respondents were neutral or expressed unfavorable responses. This suggests there was greater variability in how well participants felt the starter packs aligned with their individual curricula, and also highlights potential barriers educators are confronted with relative to required or prescribed curriculum.

The majority (68%) agreed that the Starter Packs were **comprehensive and user-friendly for teaching**, making them easy to integrate into their existing curriculum, while only 6% disagreed or strongly disagreed. The majority (78%) also agreed that the Starter Packs **provided sufficient information and guidance**, while only 3% disagreed or strongly disagreed. On the whole, responses were more favorable towards statements about PD enablement, grade appropriateness, comprehensiveness and guidance. There was less agreement about alignment to individual curricula.

When we drilled deeper into the variables influencing Starter Pack integration, we found a strong correlation between the ease of Starter Pack integration and device access. **Teachers experiencing higher levels of device access with their students were more likely to report that the PD opportunities equipped them with the skills required to implement the Starter Packs.** They were also more likely to agree that the Starter Packs were grade-level appropriate, aligned with curriculum, were comprehensive/ user friendly, and provided sufficient information and guidance for learning new skills and technology. This suggests that the level of student device access may influence teachers' interpretation of the Starter Packs. Alternatively, teachers in schools with higher levels of student device access could also have benefited from more in-depth professional development in the use of technology in the classroom, enabling them to more easily integrate the Starter Packs into their classroom.

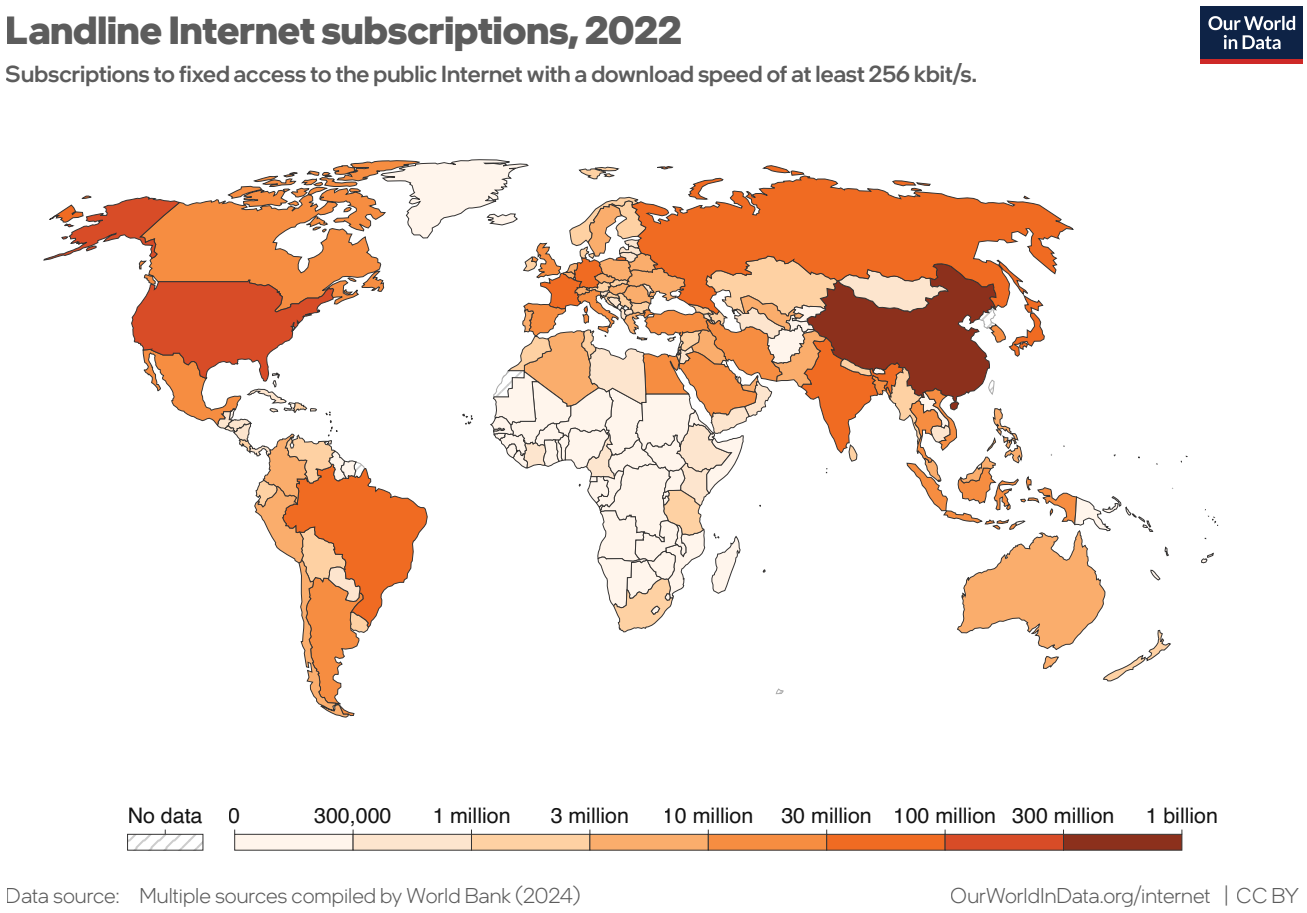
Proportion of respondents who reported "Favorable" to questions on SP integration, broken down by device access



In summary, these figures demonstrate that SFI Starter Packs are achieving initial integration into classrooms as intended, with most educators applying lessons from an average of three Starter Packs to cultivate innovative skills in their students. The resources appear well-aligned to support the program's goals. This illustrates successful uptake of the Starter Packs as a crucial component of the SFI program, and highlights an opportunity to continually support teachers in Starter Pack implementation, yielding an increased and more consistent utilization of SFI resources.

Digital Spectrum - Case Comparison

Survey participants come from over 45 countries around the world, with differing levels of access to technology and digital infrastructure. Unsurprisingly, this influences their approaches to integrating technology. This section serves to illustrate the diverse experience participants in the study have had with integrating technology into their teaching practice and how it has impacted student learning. The case method approach examines qualitative data to synthesize insights that both profiles have in common and to highlight the differences and various factors that influence their experiences.



The Digital Pioneer: Mr. S's Story

Mr. S has always had a passion for technology, even though access has been limited in the rural community where he teaches middle school science and math. With only 200 iPads shared among hundreds of students at his school, resources are scarce. However, Mr. S is determined to give his students opportunities to learn with technology.

When he first learned about the SFI program, Mr. S jumped at the chance to expand his skills. Through online courses and tutorials, he taught himself how to navigate educational websites and use their interactive tools in his lessons. It was a challenge at first, but Mr. S's curiosity and perseverance paid off. He gained confidence presenting virtual experiments and simulations to bring abstract concepts to life for his students.

Each day, Mr. S packs up the iPads and leads his classes to the computer lab, transforming it into his digital classroom. Students who had never used computers before now collaborate to solve problems together online. Mr. S loves seeing the lightbulb moments when concepts finally click through interactive games like Kahoot. The competition and real-time feedback keep students engaged and motivated to learn.

Word of Mr. S's innovative teaching methods has spread among the staff. He is often found mentoring less experienced colleagues, helping them find new ways to integrate technology into their lessons as well. Mr. S's vision is for every student to gain vital digital skills for the future, but the school's limited resources present challenges. He dreams of a day when they have enough devices for coding lessons and advanced programs.

I'm taking them very far. In fact, I'm one of the few teachers that have those skills.

Through it all, Mr. S remains passionate about continuous learning. The SFI program lit a spark that keeps him striving to bring out the best in his students, despite infrastructure barriers. He has truly become a pioneer blazing the digital path forward for his entire community.

A Champion is Born: Ms. K's Journey

For many years, Ms. K was content relying on traditional textbooks and worksheets in her middle school English classroom. But when she learned about the SFI program from a colleague, something clicked. Here was an opportunity to expand her skills and try new approaches with the technology readily available at her international school.

From the start, SFI opened Ms. K's eyes to a whole world of possibilities. She immersed herself in online courses, tutorials and lesson ideas. Soon, multimedia projects and flipped lessons became the norm. Students now collaborate virtually on Padlet boards and take interactive quizzes using tools like Edpuzzle. Data from online assessments also gives Ms. K deeper insights into individual progress.

The transition has been seamless for Ms. K's students, who each have a personal laptop or tablet at their disposal. They are highly engaged through choice, collaboration and immediate feedback. Seeing the positive results, Ms. K's colleagues now look to her as a leader in educational technology integration. She is eager to share her knowledge through school-wide professional development.

It just makes my lesson planning much easier...it just guides the lesson and helps the lesson flow better.

They really had fun...it kind of opened their eyes to...different types of advertising.

I want them to think more globally and think more outside themselves.

Ms. K remains passionate about continuous learning herself. She aims to further customize instruction based on student needs and interests. Her goal is to empower each learner as a creator using technology. Thanks to SFI opening her mind to possibilities, Ms. K now feels fully equipped to teach students for the digital future. She has truly become a champion for innovative practices in her school.

Profile/Comparison

Through their journeys, Mr. S and Ms. K demonstrate how the **right resources and ongoing support** can cultivate true advocates for technology in learning. Their stories also show how **context shapes implementation** - but with vision and determination, great strides are possible.

Mr. S and Ms. K are both passionate about bringing technology into their classrooms to enhance teaching and learning. However, their experiences with and access to digital tools differ in important ways due to the contexts in which they teach. This profile examines the factors that have shaped their technology use and abilities to become advocates for digital literacy in their own rights. It also considers how a program like SFI can better support educators at varying levels of engagement.

Mr. S teaches middle school science and math in a rural community in Nigeria. Technology access is limited—the school shares a set of 200 iPads among hundreds of students. While the government aims to promote digital skills, infrastructure and support are lacking. However, Mr. S's curiosity and initiative have made him a leader in his school's efforts. He regularly takes students to the computer lab and uses online resources to bring concepts to life. Through trial and error, he has gained confidence navigating sites and troubleshooting issues.

Students initially struggled but now collaborate to solve problems. They compete using Kahoot and other games to reinforce lessons. Mr. S also mentors less experienced colleagues. While passionate about learnin g, he recognizes the need for sustained support as technologies evolve. His vision is for every student to advance digitally but needs more devices and training to integrate subjects like coding.

In contrast, Ms. K teaches middle school English at a private international school in Lindale, Georgia, USA. Each of her 30 students has a personal laptop or tablet. High-speed WiFi is ubiquitous. However, until recently, Ms. K relied mainly on textbooks. Participating in SFI expanded her toolkit and confidence. She now designs multimedia projects, offers flipped lessons, and assesses virtually. Students are highly engaged through choice and collaboration using tools like Padlet and Edpuzzle.

Ms. K sees room for growth in areas like learning analytics and adaptive learning. She aims to individualize instruction further and empower students as creators. Colleagues already look to her for ideas, but she wants school-wide professional development on advanced uses of technology. Overall, Ms. K feels digitally literate and future-focused in her approach thanks to SFI's influence.

Both educators have become champions for technology in learning. However, their experiences illustrate how access, infrastructure, and ongoing support shape the realities of implementation. For SFI and similar programs to truly leverage passionate advocates at different stages, resources and training must differentiate based on teachers' starting points and environments. Follow-up communities of practice could sustain momentum beyond initial certification. With tailored guidance and examples, even the most limited contexts may blossom with teacher leaders paving the way for digital transformation.

Results/Discussion

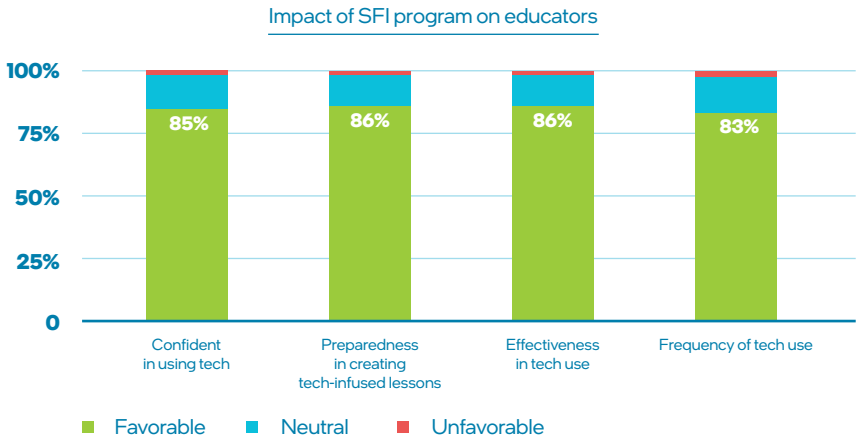
The Skills for Innovation (SFI) program aims to enhance educators' capabilities in integrating technology into their teaching practices. By analyzing quantitative survey data, qualitative insights from focus groups, detailed interviews, and additional qualitative responses from the teacher survey, we can comprehensively understand the program's impact on educators' confidence, behaviors, and frequency of technology use in classrooms.

Research Question 1

What is the impact of the SFI program on educators' (1) confidence, (2) behaviors, and (3) frequency in using technology for innovative learning?

Quantitative Insights

Impact on Teaching Practice



1

Confidence* in Using Technology: The majority of educators (85%) felt that the SFI program significantly increased their confidence in using technology in the classroom.

*Confidence in this context refers to the self-assurance teachers feel when incorporating technological tools and methods into their teaching.

2

Preparedness to Create Technology-Infused Learning Experiences: A substantial proportion of respondents (86%) agreed that the SFI program prepared them well to create technology-infused learnig experiences for their students.

3

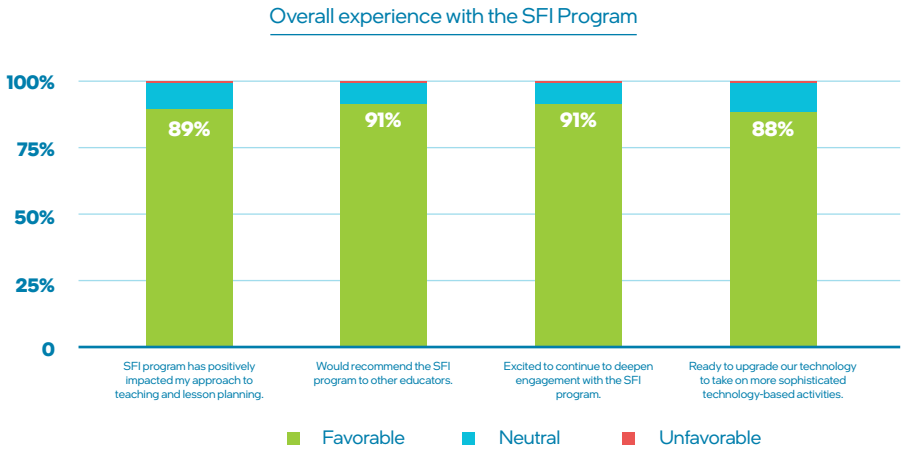
Effectiveness in Using Technology to Develop Students' Innovation Skill Sets and Mindsets: Educators largely agreed (86%) that the SFI program made them more effective in using technology to cultivate students' innovation skills and mindsets.

4

Frequency of Technology Use in Teaching: The program also led to a higher frequency of technology use in teaching, with 83% of participants indicating an increase.The program also led to a higher frequency of technology use in teaching, with 83% of participants indicating an increase.

This data underscores the significant positive impact of the SFI program on educators' confidence, preparedness, effectiveness, and frequency of technology use in the classroom. The overwhelming majority of responses were favorable, highlighting the success of the program in enhancing teachers' capabilities and integrating technology into their teaching practices. Overall, this data demonstrates that through its various components like Starter Packs and professional development, the SFI program has successfully boosted educators' technology abilities and integration. It has empowered them to cultivate future-ready skills in students through innovative uses of tech in the classroom. The goals of the program appear to be well-achieved based on these self-assessment results.

Overall Sentiments on SFI



The majority of respondents agreed that overall participation with the SFI program was a largely positive experience that has influenced their teaching approach, their propensity to recommend the program, their enthusiasm for continued engagement, and their readiness to adopt advanced technology in the classroom.

1

Overall Impact on Teaching and Lesson Planning: The majority of educators (89%) felt that participating in the SFI program positively impacted their approach to teaching and lesson planning.

2

Recommendation to Other Educators: A significant majority of educators (91%) would recommend the SFI program to other educators.

3

Excitement to Deepen Engagement: Most educators (91%) expressed excitement about continuing their engagement with the SFI program and technology-based teaching.

4

Readiness to Upgrade Technology: A large portion of educators (88%) felt ready to upgrade their technology to support more sophisticated technology-based activities

These responses highlight the overall positive experience educators have had with the SFI program, emphasizing its impact on teaching practices, willingness to recommend it to peers, enthusiasm for ongoing engagement, and readiness for technological advancements. The results clearly illustrate that through its approach, resources and impacts observed, the SFI program has delivered a successful experience that has transformed educators' practices and passions. It has created advocates eager to deepen involvement and take on more complex technological teaching. The program appears to exceed expectations based on these feedback results.

Progression in Using Technology to Create Effective Learning Experiences

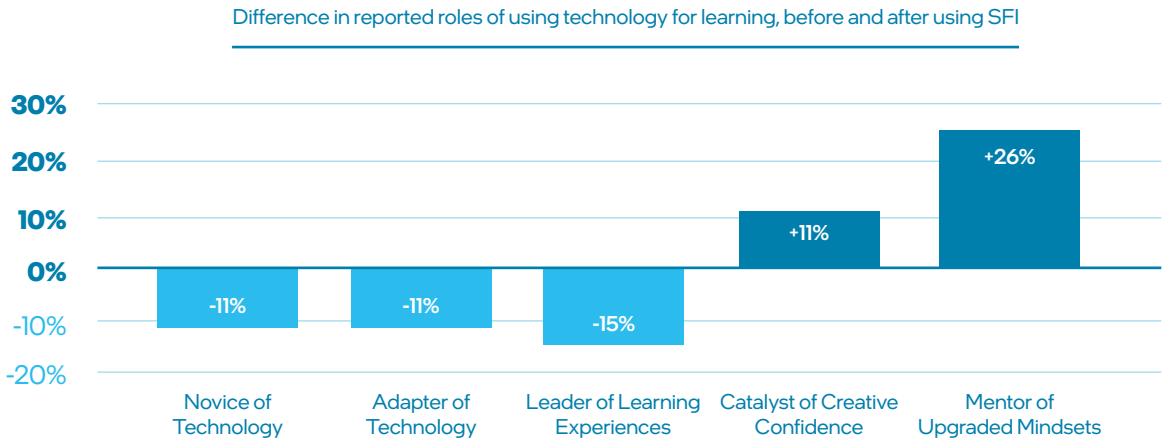
This section examines how teachers have progressed in their use of technology to create effective learning experiences for their students. The survey explored various aspects of technology integration, from initial adoption to advanced usage, and captured educators' perceptions of their growth and development in this area. The responses provide insights into the ways in which the SFI program has supported teachers in enhancing their instructional practices through technology.

Survey Statements

Teachers were asked to select the statement that best describes their role in using technology for learning BEFORE and AFTER participating in the SFI program. Five statements were provided, each corresponding to the levels of progression below:

Level 5	Mentor of Upgraded Mindsets: I guide students in adopting innovative mindsets and prepare them for the challenges of the future using technology-infused learning experience.
Level 4	Catalyst of Creative Confidence: I actively encourage innovation and effectively use technology to create engaging and creative learning experiences.
Level 3	Leader of Learning Experiences: I am comfortable using technology to deliver content and am now focusing on improving the way I design and lead learning experiences.
Level 2	Adapter of Technology: I am new to using technology in learning an am building my foundation skills.
Level 1	Novice of Technology: I have little to no exposure uisng technology in learning.

Distribution of Responses



Before	14%	21%	39%	19%	7%
After	3%	10%	24%	30%	33%

Progression Summary: Out of 627 teachers, 596 (95%) retained or increased the level of their role in using technology to create effective learning experiences. The average progression in levels was +0.95.

Analysis of the Shift in Roles

The data reveals a notable increase in the percentages of teachers at the "Catalyst of Creative Confidence" and "Mentor of Upgraded Mindsets" levels after participating in the SFI program. This increase is a positive indication of the program's success in advancing teachers' proficiency and confidence in using technology. Specifically:

- **Catalyst of Creative Confidence:** The increase of 11 percentage points indicates that more teachers are now actively encouraging innovation and using technology to create engaging and creative learning experiences.
- **Mentor of Upgraded Mindsets:** The increase of 26 percentage points highlights a remarkable shift, with many teachers now guiding students in adopting innovative mindsets and preparing them for future challenges through technology-infused learning experiences.

Correspondingly, there is a substantial decrease in the percentages of teachers at the lower levels:

- **Novice of Technology:** The decrease of 11 percentage points signifies that many teachers who initially had little to no exposure to technology have successfully moved beyond the novice stage.
- **Adapter of Technology:** The decrease of 11 percentage points suggests that a significant number of teachers have progressed from building foundational skills to becoming more adept at using technology.

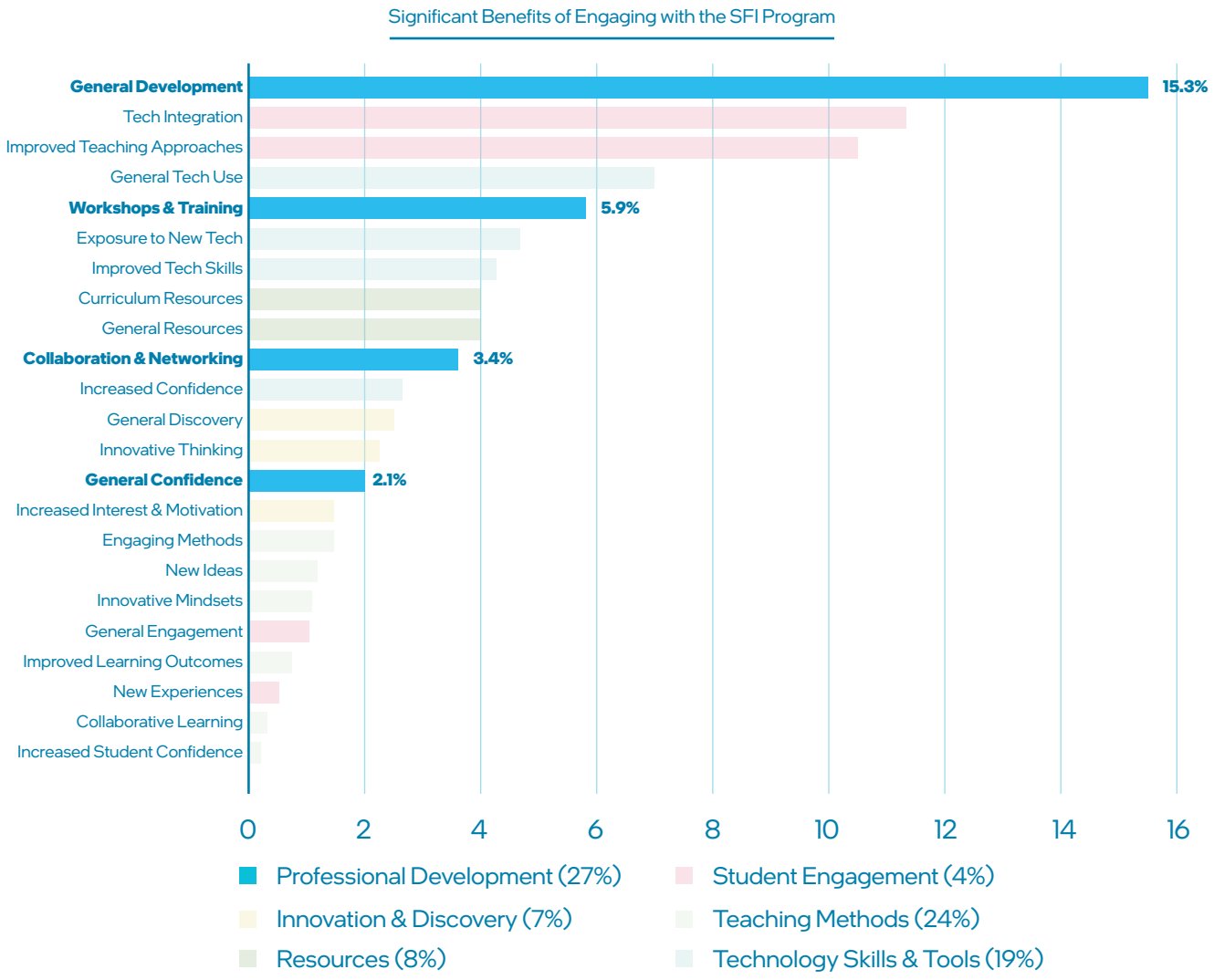
Qualitative Analysis

In addition to the quantitative data, detailed qualitative insights were gathered from open-ended survey responses, individual interviews, and focus groups with educators who participated in the SFI program. These insights provided a deeper understanding of the program's impact on educators' confidence, teaching behaviors, and frequency of technology use in classrooms, as well as their students' learning experiences. This section highlights the significant benefits reported by educators, drawing on their personal experiences and reflections to paint a comprehensive picture of the program's influence on teaching practices and professional development.

Significant Benefits from the SFI Program

Based on open-ended responses to the prompt, "What was the most significant benefit you gained from participating in the SFI program?", the SFI program has significantly enhanced teaching and professional development for educators. Teachers reported increased confidence in using technology, creating more dynamic and interactive lessons, fostering critical thinking, and encouraging collaboration among students. The program has also provided valuable resources, innovative teaching methods, and professional development opportunities, preparing students for future challenges.

The chart below categorizes the responses into six key domains highlighting the most impactful aspects of the program. Of note, the **Professional Development domain accounted for the highest proportion (27%) of responses,** underscoring its critical role in enhancing educators' skills and knowledge.



Elevating the Voices of Educators

Educators shared specific examples of how the SFI program has benefited their teaching practices and professional development. These standout quotes illustrate the diverse advantages across several key areas:

Quote	How did SFI support educators?
Technology Skills & Tools (19%):	
"Thanks to Intel SFI, I was able to utilize technologies to the fullest extent in my classroom. Teaching and utilizing technologies are the most effective ways of conveying information to students."	Highlights how the program enabled educators to fully leverage technology, making their teaching more effective.
"I learned new possibilities of teaching English using different technology tools and my students could learn more the English language while using the technological tools in class."	Educators found innovative ways to teach subjects, enhancing students' learning experiences.
"Use of new digital tools for my classes. Now I can make my classes more dynamic and interesting for the students."	The introduction of digital tools made lessons more engaging and interactive.
Resources (8%)	
"SFI program gave me a spectacular opportunity to think out of the box."	The program encouraged innovative thinking among educators.
"Learning new ways to deepen the heartset, mindset, and skillset."	It promoted holistic development in teaching strategies.
"Enhanced students' awareness of innovative thinking."	Students became more aware of innovative approaches.
Teaching Methods (24%)	
"It broadens the horizons of technology integration in the classrooms."	The program expanded the scope of technology use in classrooms.
"Ways to take SFI and STEM cross-curricular in meaningful, engaging ways. The way students use collaboration to take ownership of the lesson while learning and creating on different types of technology (hardware/software) that will enhance their opportunities in the real world."	Cross-curricular integration of technology and STEM subjects made learning more relevant and engaging.
"Making my teaching more interesting for the students and more meaningful."	Teaching methods became more interesting and meaningful for students.
"The SFI Program saved me time and effort in developing materials from scratch, and my students were more engaged and participative [in] implementing tech-based scenarios."	The program provided ready-to-use materials, saving time and increasing student engagement.

Quote	How did SFI support educators?
Professional Development (27%)	
"The most significant benefit I gained from participating in the SFI program was expanding my toolkit for student-centered learning approaches. Through innovative teaching methods introduced in SFI, I learned to structure lessons around challenging projects, group work, and discovery-based learning. These techniques foster critical thinking skills and encourage peer-to-peer learning. Participating in SFI helped me successfully apply student-centered strategies to engage every learner. I am now a more thoughtful and adaptive teacher, able to spark curiosity and promote deeper mastery of materials."	The program enriched teachers' approaches to student-centered learning.
"SFI provided opportunity to develop valuable professional skills, such as research, communication, teamwork, and problem-solving, through hands-on experience and mentorship."	The program fostered important professional skills through practical experience and mentorship.
Student Engagement (4%)	
"Learning has become more engaging."	Teachers observed increased student engagement.
Active participation of students."	Students participated more actively in lessons.
"My students become more motivated to learn and generate more self-esteem to create and share content."	The program boosted students' motivation and self-esteem.

Interviews Insights

Extended interviews with individual educators provided further insight into the impact of the SFI program on teaching and learning processes. A summary of

Educator A

Impact on Teaching

Educator A gained significant confidence in using technology for teaching after participating in the SFI program. They now incorporate devices like iPads and utilize online resources extensively, such as projecting experiments and using online quizzes to engage students. This transformation has made them one of the more advanced teachers in their school regarding technology use. They also support other teachers in integrating technology into their classes.

Impact on Learning

Students' digital literacy has improved, enabling them to independently navigate websites, participate in online quizzes, and use presentation software and Excel. The competitive and collaborative elements of online activities have made learning highly engaging and have prepared students for future digital environments. Educator A noted, "They can be able to use the computer and prepare a presentation using it."

Improvements to SFI

Educator A did not have specific suggestions for improvement, expressing satisfaction with the program's resources and a desire for continuous learning. They remarked, "I have no comment. And yeah, I don't know what to improve because I find everything so exciting.

Educator B

Impact on Teaching

Educator B's confidence and proficiency in using technology improved significantly through the SFI program. They transitioned from traditional lecture-style teaching to interactive, task-based methods, making their lessons more engaging. Educator B shared, "Before they introduced this program, I was an average user. Now, after, I'm at another level."

Impact on Learning

The program equipped students with essential research skills and tech proficiency, preparing them for higher education. Educator B highlighted that their students' performance improved, with many achieving distinctions, partly due to their enhanced engagement and familiarity with modern gadgets. They mentioned, "The program prepared our students to do better at university."

Improvements to SFI

Educator B suggested improving accessibility to devices and internet connectivity, as these were significant barriers for some students. They also emphasized the need for ongoing support and training for both educators and students.

Educator C

Impact on Teaching

Educator C's technology skills and confidence improved through SFI training. They now create interactive slides with video, audio, and assessment clips to engage students and frequently incorporate tools like Google Translate and Doctrainer into their teaching. Educator C stated, "Technology enables them to share their views without fear or limits."

Impact on Learning

Students' abilities to use online platforms and tools have increased, fostering independence in learning. The integration of technology has made learning more engaging and has helped students develop digital content, preparing them for future challenges. Educator C aims for students to "go the extra mile and be part of the developers."

Improvements to SFI

Educator C suggested more teacher training programs focused on technology integration and improving internet connectivity and hardware access. They also recommended developing offline tools to mitigate connectivity issues.

Educator D

Impact on Teaching

Educator D's confidence in using technology for teaching significantly increased, particularly appreciating the exposure to new technologies provided by SFI. They value the ability to create differentiated learning plans for IEP users, utilizing the extra resources from SFI.

Impact on Learning

The SFI curriculum has been more practical and relatable to students' lives compared to other STEM curricula. Educator D highlighted the VR activities as particularly engaging, helping students see beyond their immediate environment. They remarked, "Once they're exposed, they're invested.

Improvements to SFI

Educator D suggested integrating SFI with other software like Nearpod, adding multi-language support, and developing more age-appropriate content for younger students. They also emphasized the need to focus on fundamental skills like typing and spreadsheet use to make students future-ready.

Focus Group Insights

It is important to note that only two educators were able to participate in this focus group, which may limit the generalizability of these insights. However, their feedback provides valuable perspectives on the impact of the SFI program.

Impact on Teaching:
Both teachers in the focus group reported increased confidence in teaching technology after participating in the SFI program. One teacher mentioned feeling comfortable teaching Python despite not using it for 10 years. Another teacher took on more of a facilitator role, focusing on individual student needs. The starter packs introduced new digital tools and resources, which the teachers have incorporated into their non-SFI lessons as well.

Impact on learning:
One teacher observed significant skills development in a student who can now code independently and was willing to attempt a high school Python lesson. The starter packs also helped students understand academic concepts better, such as photosynthesis. The lessons promoted creativity, collaboration, and out-of-the-box thinking, leading to in-depth discussions and new directions in learning. One teacher stated, "I have seen my students grow so much... whatever technology you want to push in their head, put it in their head. We know where technology is leading and where it's going in the future."

Improvements to SFI:
The teachers suggested translating more starter packs into different languages to support students and colleagues who struggle with English. They also recommended adding difficulty levels or differentiated activities to cater to a wider range of students and including more starter packs using more affordable software and programs.

Additional Investigations

This section delves deeper into how various factors related to device access and capacity influence the impact of the SFI program on educators and students. By examining the effects of device access type, device access level, device capacity, device availability, device variety, and device reliability, we aim to provide comprehensive insights that can guide school and district leaders in making informed decisions about investing in technology. The goal is to highlight the importance of reliable, consistent, and varied technological resources in promoting tech-infused, innovative learning environments that enhance teaching practices and improve student outcomes.

Clarification:

Device access level refers to the actual ability of students to use these devices when needed, including whether devices can be taken home, are available at all times, or need to be shared among students. Device availability refers to the extent to which devices are present and ready for use in the classroom, focusing on the quantity and readiness of devices.

Access to Devices

This section explores how student device access types and levels affect the impact of the SFI program, providing insights for school and district leaders on the importance of investing in technology to promote innovative learning.

Effect of Student Device Access Type

Providing students with individual devices and fixed devices in classrooms shows a strong positive correlation with several key outcomes. Educators with students assigned individual devices reported the highest levels of increased confidence (87%), preparedness for creating technology-infused learning experiences (89%), and overall positive impact on their teaching approach (91%). Similarly, educators with students using fixed devices reported high confidence levels (87%), preparedness (87%), and positive teaching impacts (89%). Both groups also showed high effectiveness in using technology to develop students' skills, with 82% for individual devices and 85% for fixed devices, and a high likelihood of recommending the SFI program, with 90% for individual devices and 91% for fixed devices. These correlations highlight the importance of investing in reliable, consistent technology access to maximize the benefits of the SFI program and enhance teaching practices and student outcomes.

Effect of Student Device Access Level

Access to technology significantly impacts the effectiveness of the SFI program. Educators with devices always or usually available reported higher positive impacts on teaching and lesson planning (91%), felt more confident in using technology (90 %), and increased their frequency of technology use (88%). In contrast, educators with seldom or somewhat available devices reported lower positive impacts on teaching and lesson planning (88%), had lower confidence in using technology (81%), and used technology less frequently (79%). These correlations underscore the importance of reliable and consistent device access in enhancing educators' confidence, teaching behaviors, and frequency of technology use, ultimately promoting more effective and innovative teaching practices.

Quality and Availability of Devices

Access to devices with sufficient processing power, memory, and reliability significantly impacts the effectiveness of the SFI program. Educators who agreed or strongly agreed that their students' devices are adequate reported higher levels of confidence, frequency of technology use, and positive teaching behaviors.

Device Capacity

Confidence

88% of educators with sufficient device capacity reported increased confidence in using technology, compared to 76% who were neutral and 78% with insufficient device capacity.

Frequency of Technology Use

86% of educators with sufficient device capacity reported using technology more frequently, compared to 72% who were neutral and 79% with insufficient device capacity.

Teaching Behaviors

89% felt more effective in developing students' skills, compared to 76% who were neutral and 81% with insufficient device capacity.

Device Availability

Confidence

88% of educators with sufficient device availability reported increased confidence, compared to 75% neutral and 81% not favorable.

Frequency of Technology Use

85% of educators with sufficient device availability reported using technology more frequently, compared to 74% neutral and 81% not favorable.

Teaching Behaviors

91% felt more effective in developing students' skills, compared to 71% neutral and 83% not favorable.

Device Variety

Confidence

89% of educators with sufficient device variety reported increased confidence, compared to 76% who were neutral and 77% who reported insufficient variety.

Frequency of Technology Use

87% of educators with sufficient device variety reported using technology more frequently, compared to 76% who were neutral and 76% who reported insufficient variety.

Teaching Behaviors

91% felt more effective in developing students' skills, compared to 80% who were neutral and 76% who reported insufficient variety.

Device Durability

Confidence

90% of educators with reliable and durable devices reported increased confidence, compared to 78% who were neutral and 72% who reported unreliable devices.

Frequency of Technology Use

88% of educators with reliable and durable devices reported using technology more frequently, compared to 78% who were neutral and 66% who reported unreliable devices.

Teaching Behaviors

92% felt more effective in developing students' skills, compared to 79% who were neutral and 69% who reported unreliable devices.

Conclusion - Teacher Impact

In conclusion, the SFI program has proven to be a transformative initiative for educators, significantly enhancing their confidence, teaching practices, and frequency of technology use in the classroom. Both quantitative and qualitative data underscore the program's success in improving educators' technological skills, providing valuable resources, fostering innovative thinking, improving teaching methods, and boosting professional development. These benefits have led to increased student engagement and improved learning outcomes, making the SFI program a valuable asset in modern education. The insights from individual interviews and focus groups highlight the program's success in building educator confidence, enhancing student skills, and promoting a culture of innovation and collaboration. The availability of adequate and varied technological resources further amplifies these benefits, emphasizing the critical role of quality technology in advancing teaching practices and enriching student learning outcomes.

Quantitative Insights

Educators reported positive overall experiences, with an overwhelming majority noting an improved teaching approach, and an increased readiness to adopt advanced technology. Notably, the program was successful in shifting educators from novice to advanced technology users. They would recommend the SFI program to colleagues, and are eager to continue engagement with the program.

Additionally, educators reported the following after participating in the SFI program:

- **Increased confidence** in using technology
- **Better preparedness** in creating technology-infused learning experiences
- **Greater effectiveness** in developing students' innovation skills
- **Higher frequency** of technology use

Qualitative Insights

Educators' open-ended responses, interviews, and focus groups revealed significant benefits, including enhanced technology skills, valuable resources, innovative teaching methods, and professional development. Personal testimonies highlighted increased student engagement and preparedness for future challenges.

Additional Investigations

Analysis showed that providing students with individual or fixed devices leads to higher confidence, more frequent technology use, and more effective teaching practices. The importance of device capacity, availability, variety, and reliability was also evident.

Synthesis and Implications

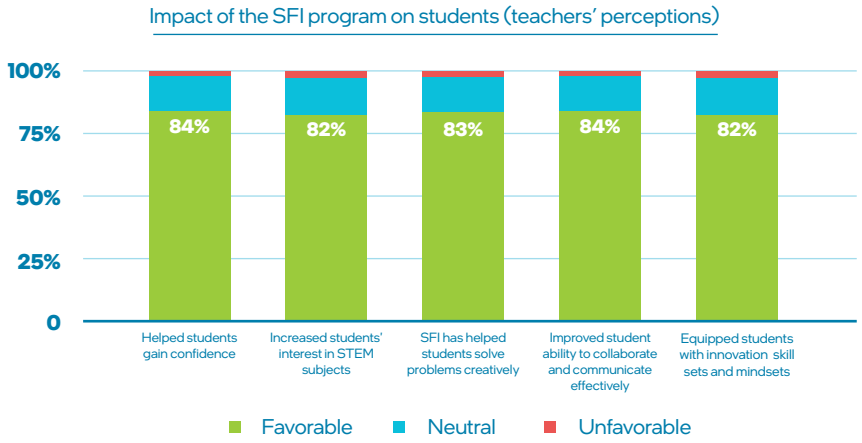
The SFI program effectively improves teaching practices and technology integration. Continued investment in high-quality, reliable, and varied technology is essential to maximize these benefits. The positive outcomes demonstrate the program's value and transformative potential, guiding future investments to enhance teaching and foster innovation in education.

Research Question 2

What is the impact of the SFI program on students' (1) skills development, (2) engagement of learning and (3) future-readiness?

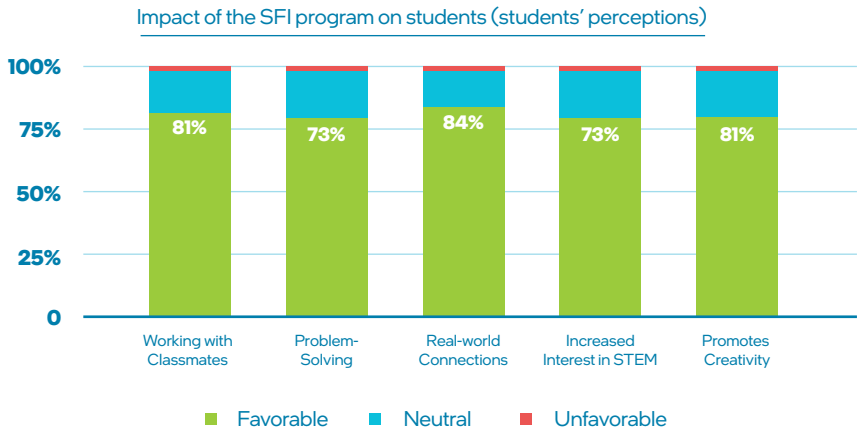
Skills Development

Teacher Survey Insights



In general, educators feel positively about the impact of the SFI program on students' skills development. This indicates the program is largely succeeding in its student learning and engagement goals. 84% agreed that the program has **improved students' ability to collaborate and communicate effectively using technology**. These are core skills that build digital literacy and future-readiness of students. 82% agreed that implementation of the SFI program helped to **increase students' interest in STEM subjects/careers** and 83% agreed that students were **gaining confidence using technology for learning**. This suggests the program is sparking student motivation. Overall, this data illustrates that through the technologies, activities and teaching approaches introduced via SFI, the program has empowered students with valuable skills while boosting their engagement and confidence. It appears well-aligned to developing future-ready learners as intended.

Student Survey Insights



Based on the student survey results (N = 167), the impact of the SFI program on students' **problem-solving skills** (73%) is notably positive, although less pronounced compared to its effect on **working with classmates** (81%). Consistent with insights from teacher interviews, students reported that the SFI program effectively helps them **connect technology to real-world applications**, with 84% expressing favorable views. However, relatively fewer students responded positively regarding the development of their problem-solving skills and career interests in STEM. As most of the respondents were in highschool (121 out of 167 respondents have teachers that taught exclusively highschool students), they might already have made up their minds for their college applications and/or future career plans, which could provide a possible explanation for this observation.

Qualitative Insights - Teacher Focus Group/ Interviews

In the 1 focus group interview (with 2 participants) and 5 teacher interviews, participants unanimously expressed positive sentiments towards the impact on students. The most quoted benefit of students' learning is the improvement of computer literacy, which was mentioned 5 times. An elementary teacher in the US compared the SFI programs with the STEM class in their school, besides helping students relate their learning to their personal lives, computer literacy also means increased ability to navigate a digitalized world. This is particularly the case for students in more resource-constrained countries. As students' digital literacy improved in the classroom of one of our interview participants in Kenya, students were starting to be able to participate in competitive and collaborative online activities, which improved learning outcomes and career potential.

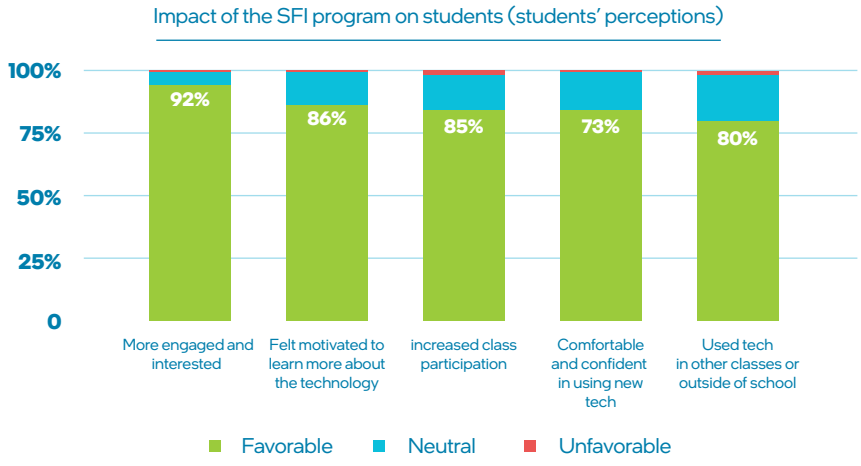
> ***So from stem class just to give you some context. But then in our school they just learn about coding and how to be safe. But I think with the SFI, it's a little bit more practical and how they can actually use that within their personal lives."***

Engagement of Learning

Teacher Survey Insights

Educators responded positively about the SFI program's impact on students' engagement in learning. Specifically, 82% agreed that the program has **increased their students' interest in STEM subjects and/or careers**. How the students' interest in the SFI program has spillover effects onto other school subjects will be further discussed with student surveys and qualitative evidence in subsequent sections.

Student Survey Insights



The student survey results indicate that the SFI program has positively impacted students' class participation. Up to 92% of students reported that the use of new technology made them **more engaged and interested in class activities**, corroborating the findings from teacher interviews. A large majority of students also felt **more motivated** (87%), experienced **increased participation** (86%), and felt **more comfortable using technology** (86%). However, the translation of these skills to other classes or outside of school appears to be slightly weaker (81%). Some teacher participants noted in their interviews that not all of their colleagues possess the same ability and confidence to integrate new technology into their classrooms. This might explain the relatively lower percentage of students who agree that they have used technology they learn in other classes due to the lack of opportunity.

Qualitative Insights - Open-ended responses from student surveys

Students were asked in their surveys about their favorite and least favorite lesson or activity that helped them learn new technology.

Student survey results indicate that the favorite topics among students were history (11%), programming languages (7%), and cybersecurity (7%). Science (6%) and environmental science (6%) followed closely. The most favored activity was games/quizzes (11%). The primary reason students enjoyed the SFI program was the opportunity to learn something new (16%), with the program's appeal to their interests also being significant (11%). Although SFI is predominantly seen as a STEM-focused program, the fact that history emerged as students' favorite subject might be surprising. Reflecting insights from teacher interviews, students also found games and quizzes engaging, which helped boost their participation. The program appears to have successfully nurtured students' curiosity, as the chance to learn something new was the main reason for their enjoyment. Additionally, the program effectively connected technological concepts with topics that students find interesting, aligning with teacher observations.

Regarding students' least favorite activities, the majority indicated that there was no "least interesting" activity (35%), or that the least interesting parts were non-technology related, such as ice-breaking activities or reading (28%). Among those who mentioned tech-related activities, "web development and coding" (8%) were the most frequently cited, followed by passive learning activities like watching videos. The lack of relevance was the most common reason for this disinterest. Some students expressed a dislike for activities such as Scratch and QB64, commenting that they did not find them useful in their daily lives and considered them boring and irrelevant.

Qualitative Insights - Teacher Focus Group/ Interviews

Two teachers talked about how the SFI program enhanced their students' engagement in class. A participant of the interview from Kenya told us how their students were aenabled to participate in interactive group activities and competitions in class due to the SFI program.

Furthermore, thanks to the hands-on and project-based nature of the SFI program design, three teachers were quoted to mention how the SFI program promotes creativity and the active consumption of knowledge by their students. For example, a participant described how SFI enabled students to learn how to research using digital tools, which increased students' engagement.

Overall, due to the change in pedagogical approach, students who were in SFI classrooms typically find themselves involved in active learning, thus improving their level of engagement.

> ***You know, they're engaged. They like the competition. There's a social and fun and love of learning (environment).***

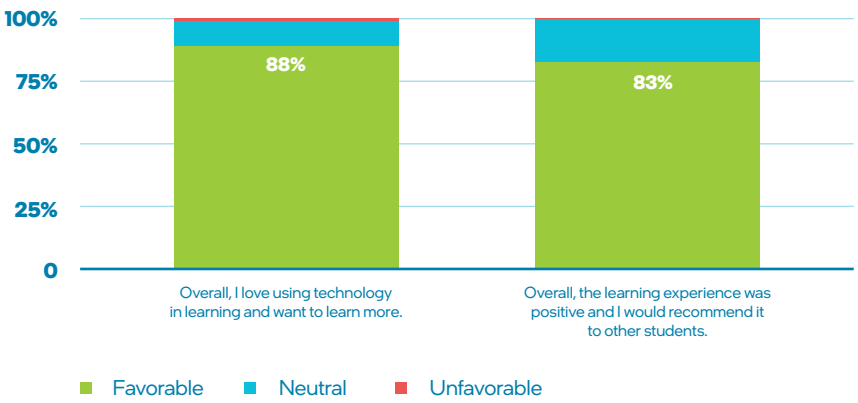
> ***I love project-based [learning] because the kids really like hands on stuff and they don't want to just be sitting behind the screen all the time***

Future-readiness

Teacher Survey Insights

Teacher survey data indicates that educators perceive the SFI program as significantly enhancing students' future-readiness. The program is credited with **increasing students' interest in STEM subjects**, enhancing their problem-solving abilities, improving their collaboration and communication skills, and equipping them with innovation skill sets and mindsets. For example, 83% of educators responded favorably to the statement that the technology skills learned through SFI help students solve problems creatively. Additionally, 82% of responses were favorable regarding the program's impact on innovation skill sets and mindsets. Overall, the SFI program is viewed as helpful in sparking students' interest in pursuing STEM-related careers while also preparing them with essential transferable skills for the future.

Student Survey Insights



Overall, students expressed a positive experience with the SFI program. A significant majority (88%) reported feeling **motivated by the use of technology in learning** and expressed a desire to learn more about it. This indicates that the SFI program effectively fosters a love and interest in technology, setting students up for future success by instilling these foundational interests.

Qualitative Insights - Teacher Focus Group/ Interview

Two teachers highlighted how the SFI program has helped students develop transferable skill sets and mindsets, preparing them for the future. One teacher cited the sustainability lesson packages and the Braille curriculum as examples of the valuable perspectives the SFI program introduced to their students. The teacher noted,

> ***[The lesson packages help my students] think of other people and not just about themselves, and it gives them perspective in helping others.***

The interviewer believed that the program helped their students build character, become more globally aware, and less focused on just their "little corner," thereby enhancing their future-readiness. Another teacher, working in a more resource-constrained environment, highlighted the skill-based benefits of the program and believed that SFI could help their students gain easier access to universities. These responses emphasize that the SFI program not only builds technical skills but also, through its multidisciplinary nature and focus on social issues and equity, helps learners become better global citizens and future-ready.

Student Survey Results: Open-ended questions

When students were asked about the technology tools that they were most excited to learn more about in the coming year, the overwhelming majority of responding students expressed interest in learning about AI (32%), followed by extended reality (19%). This is potentially due to the extensive mentioning of AI by the general media and social media after the initial launch and subsequent public interest in generative AI tools like ChatGPT. It might be worthy of continuing the development of AI-related learning materials due to the strong student interest in the topic.

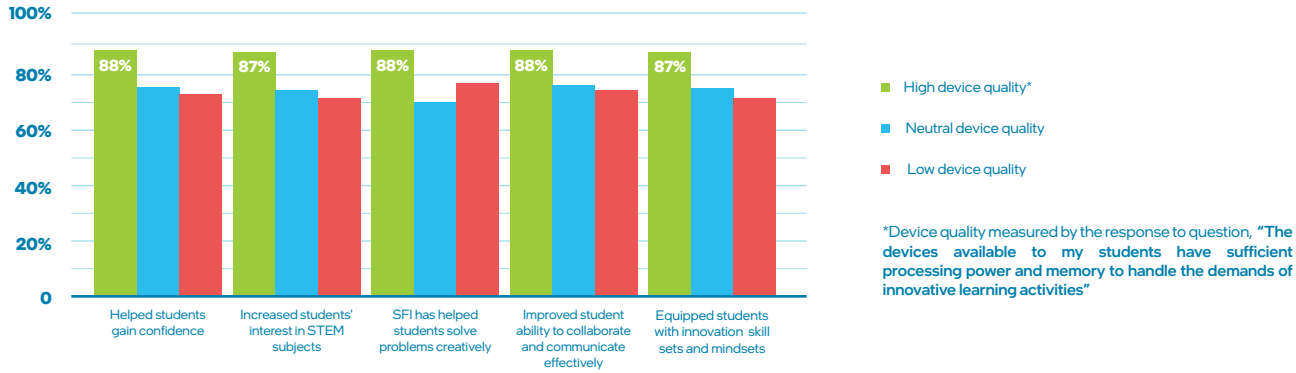
Additional Investigations

Learning Conditions

In this section, we explore the factors that teachers perceive as contributing to higher student impact. These factors include device quality, availability, and type, as well as the subjects and grade levels taught by the teachers. The numbers in the following visualizations represent the percentage of favorable responses for these questions, broken down by teacher subgroups.

Effect of Device Quality on Student Impact

Impact of the SFI program on students (teachers' perceptions), split by perceptions on device quality

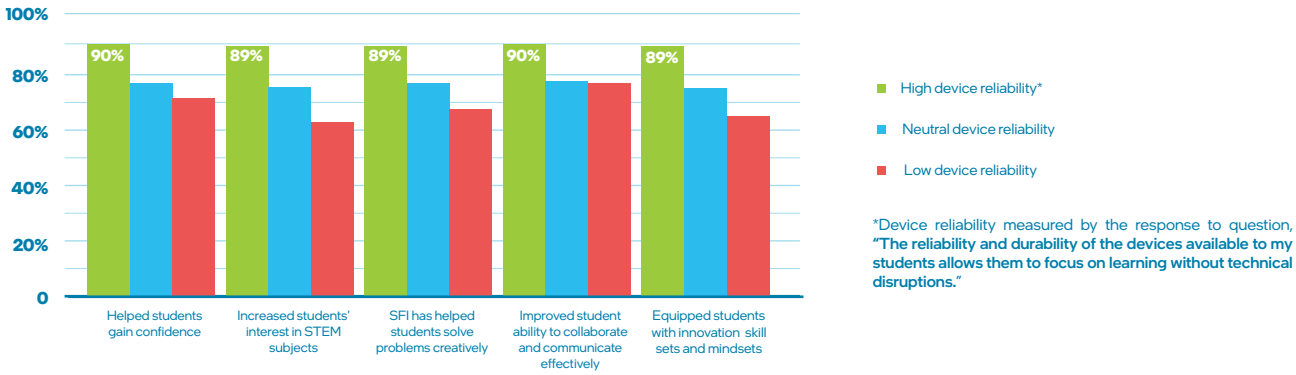


*Device quality measured by the response to question, **"The devices available to my students have sufficient processing power and memory to handle the demands of innovative learning activities"**

Teachers whose students had higher-quality devices were more likely to agree that the SFI program had a positive impact on their students. For those who reported that their students have high-quality devices, the average favorability across the five questions about student impact was 87% - 88%. This percentage decreases with lower device quality, with those who reported that their students have low quality devices averaging only 71% - 77% favorability. This data highlights the strong relationship between device quality and the perceived impact on students' skills, engagement, and future-readiness.

Effect of Device Reliability on Student Impact

Impact of the SFI program on students (teachers' perceptions), split by perceptions on device reliability

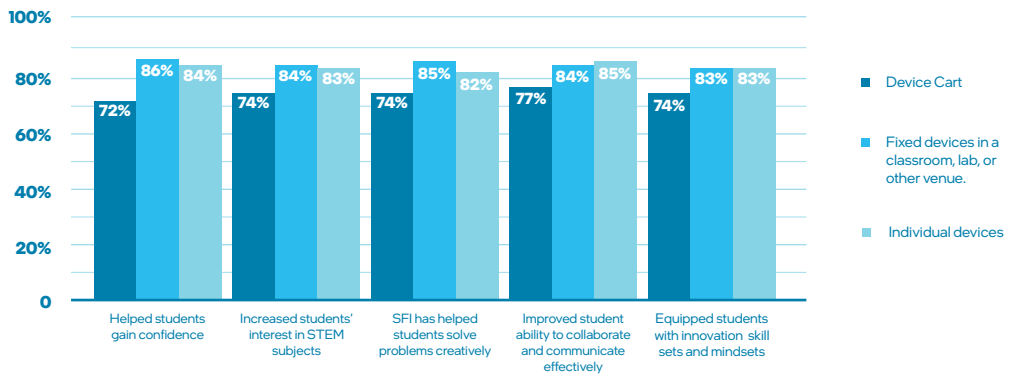


*Device reliability measured by the response to question, **"The reliability and durability of the devices available to my students allows them to focus on learning without technical disruptions."**

Similar to the previous analysis, **the reliability and durability of devices are highly correlated with student impact.** For teachers who cited a high device reliability across student devices, 89% - 90% provided favorable responses across questions regarding student impact. This trend continues across all indicators, as teachers who were neutral on the reliability and durability of students devices reporting a higher student impact than those who disagreed. Just like device quality, device reliability and durability is important in enhancing student outcomes.

Effect of Type of Access on Student Impact

Impact of the SFI program on students (teachers' perceptions), split by type of access

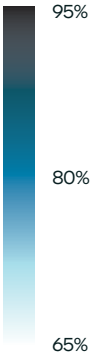


Teachers using device carts reported the lowest favorable responses across all metrics, with 72% noting confidence in using technology for learning and 77% recognizing improved collaboration and communication. In contrast, **teachers with fixed devices in a classroom or lab reported higher favorable responses**, with 86% noting increased confidence in using technology for learning and 85% observing improved problem-solving skills. Similarly, **teachers with individual devices reported high favorable responses**, with 84% acknowledging increased confidence in technology use and 85% recognizing improved collaboration and communication. These results suggest that the location of access is not the primary driver of student impact. Instead, the ability to control the availability of devices appears to be crucial, as using device carts often requires coordinating with IT support or other teachers, whereas fixed or individual devices likely provide greater flexibility.

Effect of Grade Level on Student Impact

Impact of the SFI program on students (teachers' perceptions), split by grade level

	Helped students gain confidence	Increased students' interest in STEM subjects	SFI has helped students solve problems creatively	Improved student ability to collaborate and communicate effectively	Equipped students with innovation skill sets and mindsets
Early Childhood/ Kindergarten (Ages 4-6)	81%	88%	88%	94%	75%
Elementary School (Ages 6-11)	88%	85%	87%	85%	86%
Middle School (Ages 11-14)	88%	87%	84%	84%	80%
High School (Ages 14-18)	83%	81%	81%	86%	82%
More than 1	78%	79%	80%	78%	78%

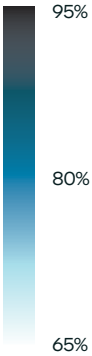


Most participants (37%) of this survey teach high school students exclusively, followed by elementary school (25%). While we note the concerns raised (particularly in the qualitative data) about the grade-level appropriateness of the SFI Starter Packs, the results here indicate that students' learning of skills and development of confidence are not affected by their grade level. In fact, elementary school teachers reported higher levels of favorable responses in all but one indicator (i.e. effective collaboration and communication). This points towards a perception that students are still gaining confidence and skills, regardless of concerns about grade-appropriateness. A possible explanation is that the SFI Starter Packs for elementary school may lack the more sophisticated technology covered by SFI, making these innovations more novel and engaging for elementary school students compared to their middle or high school counterparts. Another possibility is that teachers are proactively adapting the Starter Packs to cater to their respective student profiles, driving positive student impact despite concerns about grade-level appropriateness.

Effect of Subject Taught on Student Impact

Impact of the SFI program on students (teachers' perceptions), split by subject taught

	Helped students gain confidence	Increased students' interest in STEM subjects	SFI has helped students solve problems creatively	Improved student ability to collaborate and communicate effectively	Equipped students with innovation skill sets and mindsets
Visual Arts	81%	74%	76%	76%	74%
Career and Technical Education	69%	75%	73%	81%	69%
Foreign Language	90%	86%	82%	84%	84%
Geography	84%	84%	80%	80%	80%
Health	72%	72%	66%	69%	66%
Language Arts	81%	79%	81%	78%	80%
Mathematics	81%	79%	82%	81%	80%
Other	75%	74%	74%	72%	74%
Science	86%	86%	85%	87%	85%
Social Studies/History	79%	82%	79%	82%	79%
Technology/ Computer Science	83%	82%	81%	84%	83%

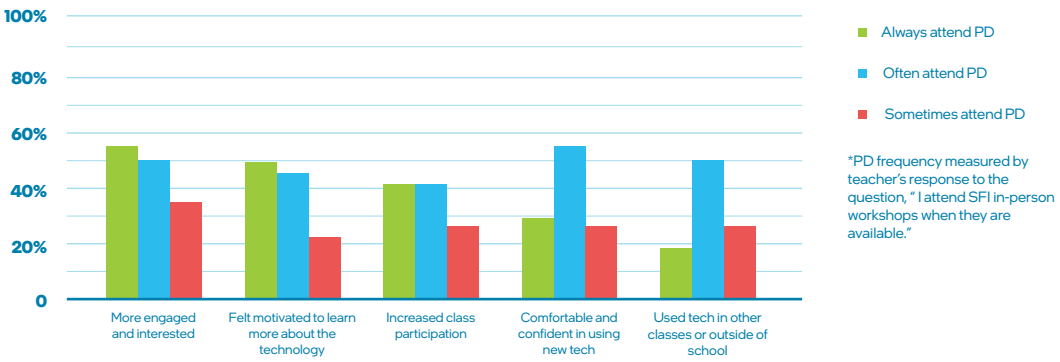


Most teachers (60%) who participated in the survey are either Science or Technology/Computer Science instructors. They rated the SFI program highly across various questions regarding student impact - all questions have received more than 80% of favorable responses on average from teachers in these two disciplines. Notably though, for non-STEM subjects, Foreign Language and Geography teachers also rated SFI's student impact very highly. Conversely, teachers in Health or Career and Technical Education perceived a slightly lower student impact, indicating potential areas where additional support for teachers in these disciplines could be beneficial.

Teacher Attribution

Dashboard engagement data was analyzed for teachers with more than 10 students surveyed. However, for the nine teachers meeting this criterion, their engagement data was either incomplete or limited. They had not completed any PD courselets, and only one teacher had downloaded three lessons. Although the engagement data includes more data points, most teachers showed only a single instance of engagement. The table below illustrates the relationship between teachers' engagement and their students' (n = 139) engagement in technology.

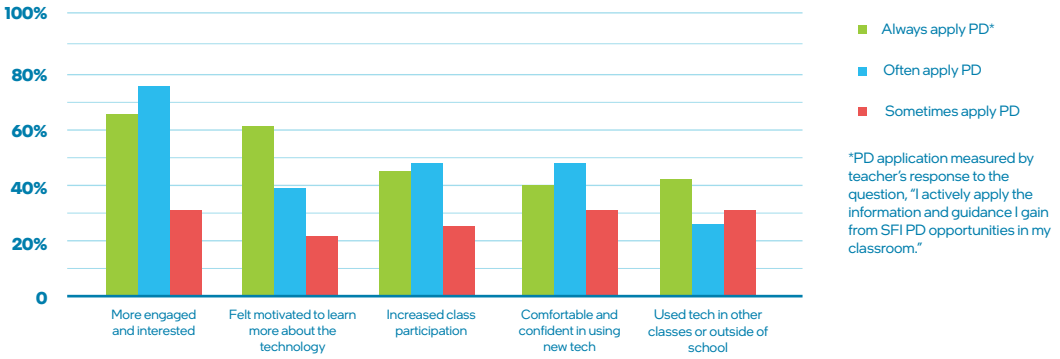
Impact of the SFI program on students (students' perceptions), split by application of teacher PD



*PD frequency measured by teacher's response to the question, " I attend SFI in-person workshops when they are available."

The students of teachers who always participate in in-person professional development (PD) workshops outperform other students in being engaged in class activities and feeling motivated. However, the results are less conclusive for participation and confidence in using new technology.

Impact of the SFI program on students (students' perceptions), split by application of teacher PD



*PD application measured by teacher's response to the question, "I actively apply the information and guidance I gain from SFI PD opportunities in my classroom."

The frequency with which teachers apply the information and guidance from the SFI professional development sessions strongly correlates with student-reported participation in class. Teachers who consistently apply learnings from SFI PD outperform those who apply them only occasionally across all five student engagement metrics. For example, 65% of students whose teachers always followed the guidance from SFI PDs strongly agreed that they became more engaged and interested in class activities. In stark contrast, only 31% of students whose teachers only sometimes followed the guidance from SFI PDs strongly agreed that they were more engaged and interested in class activities.

Combining the results of the two analyses above, it seems that SFI PD sessions have an overall positive impact on student engagement. Specifically, teachers who implement the learnings from the PDs with high fidelity have students reporting considerably higher levels of engagement in the classroom. SFI should consider developing strategies to encourage teachers to follow the PD guidance with greater fidelity.

Research Question 3

How do educators feel the SFI program could be refined and improved further?

Alongside the positive sentiments surrounding the SFI program, educators provided important feedback to help improve its effectiveness and impact. This feedback highlights three key areas for refinement: enhancing existing content, building teacher capacity to use technology innovatively and promote digital literacy in the classroom, and providing the necessary infrastructure and hardware for successful implementation. Educators' insights are invaluable in guiding these improvements, ensuring that the SFI program not only maintains its current strengths but also evolves to meet the changing needs of both teachers and students. By addressing these areas, the program can better support educators in creating engaging, future-ready learning environments.

Content Enhancement

A significant segment (28%) of educators commented that further enhancements to the current pool of SFI resources would support their efforts to promote future-ready skill sets and mindsets in their classroom. Within this group, suggestions for specific enhancements include:

Localization

19% of all educators polled indicated that **localization of content** would help them implement the SFI program more effectively in their classrooms. Notably, 49% of respondents from China indicated that this was the case (compared to 7% for the rest of the world). To many of these educators, localization also meant a closer **alignment to national curriculum standards**. A sizable minority (7%) of all educators felt that that curriculum misalignment was a challenge in implementing the SFI program, and one educator commented that "the biggest challenge is to cover the syllabus side by side with the SFI program." At the same time, educators acknowledged that national curricula had to evolve to be in line with the future-ready orientation of SFI as well, with one educator commenting:

> ***[C]urriculum needs to be designed with the use of technology built into it, but in a manner where the content is used to develop innovative skills through the use of technology. This is a mammoth task [especially] in public schools, where there is rigid adherence to the prescribed curriculum.***

At the same time, educators' desire for more localized content extends beyond curriculum alignment. They also expressed an interest to see more Starter Packs **translated into local languages** (9% of respondents) and **case studies/examples more relevant to their local context** (7% of respondents). This was often framed in terms of supporting students who were weaker in English. One educator commented that many of her students were from immigrant backgrounds where English was not their first language, and offering more robust multilingual support would help to address issues of digital inequity in her classroom. Other educators pointed out that many teachers themselves were not fluent in English, and might not be confident in adapting a Starter Pack not written in the language of instruction.

Support for third-party tools

19 educators commented that **greater support for third-party software tools** featured in the Starter Packs would provide greater flexibility in implementing SFI. Of this group, many shared that providing recommended alternatives for the software featured within Starter Packs would be useful in cases where "district approval of recommended software can be an obstacle" (CTE teacher, USA). Other respondents wondered how existing edtech software they were already using - for instance, Nearpod - could be woven into the lesson plans outlined within each Starter Pack.

Instructional material

A cluster of responses revolved around specific changes they would like to see within the instructional material (worksheets, slides and Educators' Guide) of each Starter Pack. While supportive of the hands-on and project-based learning orientation of the Starter Packs, 17 teachers commented that they would benefit from having instructional material that was **differentiated for different learner profiles**, including accommodations for special needs learners. Doing so would offer, for instance, "simplified alternatives for...the Jupyter Notebook [Starter Packs]" to cater to learners who needed to build confidence in the technology used, while "extension activities...to push the faster learners" (Computer Science teacher, Spain). Five teachers mentioned that more detail could be provided on **assessment strategies** to clarify student learning.

> **[An] increased focus on formative assessment strategies, such as peer/self evaluation, would aid in empowering students through feedback.**

Starter Pack creation

A significant segment of respondents (8%) indicated that they would like to see **additional Starter Packs developed**, either focusing on specific subjects they were teaching, or emerging technology areas (e.g. robotics, AI). This could be a reflection of a desire to bring the implementation of SFI closer in line with local curriculum, or specific future-ready skills that are perceived as important. For instance, one teacher commented that she would like to see more SFI Starter Packs in the realm of "financial literacy, especially for high school students".

Capacity Building

11% of educator respondents felt that more robust and intentional professional development opportunities would help increase confidence and aptitude of teachers implementing the SFI program. This was the case even for teachers who had benefited from the SFI PD modules. Most agreed that this would help to address worries amongst a significant minority of teachers regarding not being knowledgeable enough to conduct lessons on emerging technology (6%), or shifting their pedagogy towards more student-centric approaches (3%).

Training

The general consensus amongst this group was that **additional training** would help teachers understand the future-ready mindsets, skill sets and technology tools explored within SFI, as well as keep them abreast of developments in technology. One teacher mentioned that SFI training could be localized further and explore the concepts covered in greater depth, as the existing training he received served merely as an introduction to the program:

> **The [SFI training] gave me an initial exposure, but...most of the time, we don't really have experts who are giving us exclusive training in our language...I end up [having to do] further exploring on the platform by myself.**

Suggestions on training modalities included workshops and webinars. Teachers indicated a preference for hands-on PD experiences where they could "try out some of the Starter Pack activities and discuss applications with like-minded teachers". Of note, nine teachers explicitly mentioned a preference for in-person PD, which would allow them to easily clarify any questions they had with the trainer.

Community activities

Within this subgroup, 21 teachers further recommended **building a stronger professional learning community** within the SFI network. A number suggested encouraging teachers to share authentic teaching artifacts, such as student work or videos of themselves conducting the Starter Packs, which could serve as references for the broader community. Two teachers suggested mentoring and coaching structures, where more experienced teachers could "mentor the newcomers to SFI, and provide guidance, feedback, and support throughout the program".

Infrastructure and Hardware

5% of educators recommended that the SFI program be enhanced to **incorporate hardware provisioning and support**. As might be expected, teachers within this subgroup were also more likely (76%) to report that devices were only "sometimes" or "seldom" available for their students, compared to the average respondent (61%). Educators in this group recognized that promoting future-ready skill sets and mindsets requires an exposure to industry-ready software, which do not run well on students' existing devices. In other cases, particularly for educators in developing countries, the issue revolved around insufficient devices for each student - or even the educator himself - to have hands-on exposure to Starter Pack content. Moreover, a few educators mentioned that network infrastructure was insufficiently robust to run the software programs featured in SFI.

Recommendations

This report has demonstrated the significant positive impact of the SFI program on both educators and students. The program has successfully increased educators' confidence in using technology for innovative teaching practices, fostered a change in teaching behaviors towards technology-infused learning experiences, and increased the frequency of technology use in classrooms. These positive outcomes have translated into significant student gains in areas such as technology skills, engagement in learning, and perceived future-readiness.

However, the research has also highlighted areas where the program can be further enhanced and strengthened to realize its full potential. The following program and policy recommendations aim to build on the existing successes of the program and address the key areas for improvement identified through the research.

Program Recommendation s

We highlight here recommendations for the Intel SFI team to consider when evaluating and refining the program.

Enhancing Content and Resources

The SFI program serves a diverse teacher and student population. This study suggests that in order to ensure greater accessibility and relevance for this diverse community, the program will need to prioritize the customization and localization of its resources.

First, SFI should leverage Generative AI for customization. The rapid advancement of generative AI technology presents a valuable opportunity to enhance the program's flexibility and adaptability. By incorporating tested AI tools, the SFI program can create customized and personalized learning experiences for students. This includes using AI tools to facilitate differentiated instruction, where activities and materials are tailored to meet the unique needs of different learners, including students with special needs, bilingual learners, and other targeted demographics. SFI could look towards pioneers in the field like Diffit, for examples of how this has been done at scale while minimizing risk. SFI should also consider using AI tools to facilitate country-specific localization, particularly in regions like China where around half of 177 total respondents indicated a greater desire for localization. Localization includes both the translation of materials into local languages and adapting examples to specific cultural contexts. While human-in-the-loop checks should still be retained, Generative AI will enhance the overall efficiency of localization efforts, ensuring the continued accessibility and relevance to educators and students around the world.

Second, SFI should consider expanding the scope of Starter Packs to reach a wider audience and address the evolving needs of various subject areas and grade levels. This includes developing new Starter Packs for subjects not currently well-represented in the program, such as health, arts, music and foreign languages. It is worth exploring if current Starter Packs can be adapted to cater to some of these less well-represented subjects - retaining the gist of the technology-integrated activity while weaving in different cross-curricular connections. Echoing the suggestions of our educator respondents, SFI should also continue to ensure that Starter Packs are designed with real-world relevance in mind, as well as connected to students' interest. Future-ready skill sets, like AI or coding, should be taught in the context of age-appropriate scenarios to ensure authentic learning. Finally, SFI could consider creating age-appropriate Starter Packs specifically designed for early learners (Kindergarten to 2nd grade). While self-reported engagement levels of younger learners was high and on par with their older counterparts, designing resources explicitly for younger learners (e.g. addressing technology basics) would help foster a foundation for future-ready skills from a young age.

Scaling SFI Across Education Systems

Throughout our study, teachers uniformly indicated a desire to see the SFI program scaled up further, to impact more teachers. However, achieving widespread adoption of the program will require strong coordination between Intel, local partners, and education systems around the world.

First, SFI should continue and intensify the existing approach of engaging system leaders and decision makers (e.g. Ministry officials, district leaders, administrators) to get their buy-in and support for the program. Despite the well-known long adoption cycles of working through systems leaders, these leaders are often highly influential in promoting and introducing SFI amongst their constituents. To strengthen this strategy, we recommend that SFI should invest further in establishing thought leadership and brand recognition in the field of education and edtech, to position itself as the partner of choice for system leaders and decision makers. This should be done by highlighting the impact and outcomes of SFI within lighthouse sites where adoption of SFI is high. Concurrently, these lighthouse sites should also be supported with resources and incentives to encourage them to advocate for SFI with peer districts or schools, as these user testimonials help to influence other administrators and leaders.

Second, we recommend a 'bottom-up' approach focused on promoting the SFI program through direct educator engagement, which will complement the 'top-down' approach via the engagement of system leaders mentioned above. Effort has already been made in this regard, in the form of a robust Ambassador Program, regular webinars and SFI presence at education conferences. To enhance current efforts, we recommend the expansion of the existing Ambassador Program by increasing both the number of qualified ambassadors and the opportunities for them to share about the SFI program with fellow educators. This is an invaluable tool in expanding the reach of SFI - for many educators we surveyed, the strongest endorsement of SFI was found in "hearing how other teachers...have done it [with] their class" (CTE educator, USA). We also suggest organizing in-person meetups for SFI educators, for ground-level community building and deep engagement. These meetups could be facilitated by local Intel partners and hosted by lighthouse schools/districts. Along with the valuable networking, these gatherings also present an opportunity for educators to share their experiences with the SFI program and, over time, create a community of practice around SFI.

Enhance Professional Development Offerings

This study demonstrated the importance of teacher professional development (PD) for the continued effectiveness of the SFI program, with a strong correlation between the number of PD hours consumed on the SFI platform, and student self-reported engagement levels. Hence, the program should be further enhanced by creating a more robust and intentional professional development program for educators. This will require a shift from one-off workshops to a long-term, ongoing support model that prioritizes teacher growth and development.

While PD resources are widely available on the SFI platform, they are scattered across different modalities; additionally, PD trainers are given considerable latitude in designing their PD plan. For closer alignment between PD and the desired outcomes of SFI, the program should consider developing a 'menu' of recommended PD options, leveraging on existing SFI PD resources and backed by research. This could first involve an audit of the existing connections and degree/type use of existing available PD resources. Rationalizing across PD resources and articulating the connections between them, if any, would provide partners and teachers with a clear vision on SFI's approaches to professional development. Thereafter, SFI should consider working with local training partners to develop a 'menu' of recommended PD programs, drawing on research-backed modalities like professional learning communities and learning walks, as alternatives to the current workshop-oriented options. Partners should be encouraged and supported to adapt the existing SFI PD resources for educators they are working with. Eventually, these experiences should be documented and shared with other partners, to grow the overall SFI ecosystem.

The study also demonstrates a strong desire amongst teachers to learn how their colleagues have used technology innovatively in the classroom. In this vein, SFI should aim to grow a vibrant teacher community focused on professional growth. We should further investigate how the SFI Platform, and specifically the SFI Forum page, could be fully exploited in service of this goal. As the central location available for all SFI educators to connect asynchronously, the SFI Forum page serves as the de facto hub of the SFI community. Due consideration should be made on how to encourage teachers to share their experiences with SFI - for example, by providing incentives to upload authentic teaching artifacts, including student work, videos of lesson delivery, and reflections on their experiences with the SFI program.

Policy Recommendations

Focusing on future-ready skill sets and mindsets is a policy priority that requires education leaders and administrators to work in tandem with educators and other stakeholders. Policy makers and leaders should consider the following when determining how to promote the innovative use of technology in K-12 classrooms.

Addressing Device Access and Infrastructure Challenges

The research findings collectively underscore the critical role of device access and reliable infrastructure in the successful implementation of the SFI program - when access to suitable devices is more abundant, teachers are more confident student outcomes are stronger. Conversely, the program's potential to foster innovative learning experiences is significantly limited when schools and educators lack access to suitable devices and reliable internet connectivity. How school systems address this challenge will directly affect the effectiveness of SFI.

Our research suggests that education systems should prioritize device provisioning as a key enabler of student outcomes. This includes ensuring that students have access to devices that can handle the demands of innovative learning activities and specialized tools required for certain Starter Packs. While acknowledging resource constraints faced by school systems, we believe that systems need to be intentional about both the quantity and specifications of devices procured, if these devices are to make a tangible impact. To ensure this is the case, device purchasing decisions should be made with close reference to the desired graduate outcomes articulated by policy, and made in close consultation with curriculum leaders and teacher leaders. Where budget constraints pose a challenge, education systems should actively explore strategic partnerships with edtech companies or hardware providers, which could enable subsidized device access.

While providing appropriate devices are crucial, ensuring they are adequately networked and connected is equally important. Hence, education systems should not overlook the development and updating of technical infrastructure. This includes providing assistance and support for schools to enhance their network infrastructure, ensuring sufficient bandwidth and reliability for technology-intensive learning activities. Schools must have robust and resilient network systems capable of handling the increased demands of modern educational technologies and online resources. Additionally, education systems should offer ongoing technical support to educators and schools to address any hardware or software issues that may arise during the implementation of the SFI program. This technical assistance should be readily accessible and responsive, ensuring that any disruptions to the learning process are minimized. By providing continuous technical support, schools can maintain the functionality and efficiency of their technological tools, thereby maximizing the benefits of the SFI program.

Strengthening Teacher Professional Development

In line with the recommendations in the previous section on enhancing the SFI professional development (PD) offerings, it is also essential for schools and school systems to continuously refine their craft to stay ahead in the ever-evolving educational landscape. Developing robust professional development systems will not only ensure that teachers and teacher leaders are equipped to maximize the use of SFI PD offerings, but that the education system as a whole is geared towards continuous improvement and changing technologies.

First, education systems should work in concert to develop a teacher growth model centered on digital literacy and future-skilling. While there are widely used models for assessing student digital literacy competencies, the field that examines how educators are equipped to impart these competencies is more sparse. Creating a teacher growth model for digital literacy skills will help better articulate the needs of teachers and, in turn, how targeted PD can bridge the gap.

This growth model should provide a clear and comprehensive framework for defining and developing teacher competencies in digital literacy and the delivery of future-ready skills. Additionally, it should outline specific skills, knowledge, and dispositions necessary for educators to effectively integrate technology into their teaching practices. A common vocabulary around these competencies will enable more effective communication and goal setting within the education system.

Using this framework, we can promote a data-driven and customized approach to SFI PD. For example, education systems can work with the SFI program to determine teachers' baseline digital literacy competencies via intake surveys administered on the SFI platform. This allows for targeted interventions based on their needs and skill gaps, ensuring that PD is tailored to individual teachers, maximizing its effectiveness.

Second, due consideration should be given to formalizing mentoring and coaching programs for educators teaching with technology. Encouraging the development of robust mentoring and coaching structures, between teachers of different levels of exposure to SFI (or digital literacy more generally), will support teachers' ongoing growth. Experienced educators should guide and support newcomers, sharing best practices and fostering a collaborative learning environment.

Third, schools should consider strategies to nudge teachers to try new pedagogical approaches learned from professional development sessions in their classrooms. This stems from our finding that whether teachers have applied SFI PD is a better predictor of student impact, than the amount of PD consumed. To encourage this, schools can create a supportive environment that fosters experimentation and innovation - teachers need to understand that they are not expected to use new technology or pedagogical approaches perfectly on the first try!

Finally, it is necessary to address the change management required for program implementation. While educators we surveyed were enthusiastic about helping to promote the resources and paradigm shift brought about by SFI, a number would benefit from strategies to convey the benefits of SFI to conservative colleagues. Developing clear communication plans and offering training in change management can empower teachers to advocate for SFI effectively, fostering a more supportive and unified approach to educational innovation.

By implementing these recommendations, the Intel Skills for Innovation program can continue to make a significant positive impact on the educational landscape. By strengthening its resources, expanding its reach, and providing ongoing support to educators, the program will play a critical role in equipping students with the skills and mindsets needed to thrive in a rapidly evolving digital world.

Conclusion

The Intel Skills for Innovation (SFI) Program has made significant strides in enhancing educators' technology integration and fostering innovative learning experiences for students. The program has successfully increased educators' confidence in using technology, influenced their teaching behaviors towards more innovative and technology-infused methods, and increased the frequency of technology use in teaching.

Moreover, the SFI program has positively impacted students' learning and engagement, helping them gain confidence in using technology, increasing their interest in STEM subjects and careers, and equipping them with innovative skill sets and mindsets like computational thinking and design thinking.

For SFI to increase its impact in the education ecosystem, there are areas for improvement that can further refine and enhance the SFI program. These include enhancing the existing content, providing more robust professional development opportunities, incorporating hardware provisioning and support, improving curriculum, grade, and subject alignment, and addressing budget constraints.

To engage more users, the SFI program could develop a comprehensive user engagement strategy, leverage social media and online platforms, and offer incentives for user engagement. To promote global equity and provide opportunities for users to upgrade to more advanced technology, the SFI program, in partnership with Intel, could advocate for digital equity, offer tiered resources, and partner with other technology companies.

By addressing these areas for improvement and implementing these recommendations, the SFI program can continue to evolve, maximize its impact on developing a generation of innovators, and scale globally. The future of education is digital, and the SFI program is well-positioned to lead the way in preparing educators and students for this digital future.

Summary

This study evaluated the impact of the Intel Skills for Innovation (SFI) professional development program on educators and K-12 students. The project engaged over 600 educators and students to assess the effects of the program on areas such as educators' technology skills and integration practices, and students' skill development, learning engagement, and career readiness. Focus groups and interviews provided additional qualitative insights.

The results indicate that SFI significantly increased educators' confidence in using technology, improved their ability to design technology-infused lessons, and led to more frequent technology use in teaching. Students demonstrated gains in technology skills, engagement, and future-ready competencies like problem-solving and collaboration. The findings reveal SFI as an effective initiative for developing innovative teaching practices and a generation of learners prepared for future challenges.

Future Exploration

The following section articulates possibilities for future investigation based on the findings of the current study while considering the limitations that surfaced.

- **Intentional Frameworks and Standards**
  - Conduct ongoing assessment of educators' digital literacy skills. The report found that effective professional development is key to technology integration, but did not assess teachers' baseline skills. Administering regular digital literacy assessments could help calibrate expectations for skill development through SFI and ensure professional learning opportunities are appropriately targeted.
  - Develop standards or competency frameworks for educators' digital literacy and ability to teach future-ready skills. While standards exist for students, the report noted the lack of guidance for defining and cultivating teachers' technology skills. Creating research-backed frameworks in this area would provide clarity around desired outcomes from the SFI program.

- **Prepare for and Monitor Longitudinal Impact Studies**
  - Evaluate the long-term impact of SFI beyond the initial implementation period. The report only measured short-term perceptions of the program's effects. Longitudinal studies could assess whether changes in teaching practices and student skills are sustained over time. This would help determine if ongoing support is needed.
  - Administer a longitudinal study of recommended SFI classroom technology configurations. Compare student performance, subject interests, transferable skill development between classrooms meeting and not meeting device access guidelines. Provide data to justify investments in digital learning environments.
  - Perform follow-up investigations of students taught by SFI-certified educators. Track career and education pathways to quantify long term impacts of SFI on workforce/post-secondary readiness. Promote successes to expand program scale-up and hardware sales.

- **Explore accessibility and equity relative to resources and digital literacy**
  - Investigate the relationship between technology access conditions and student learning outcomes in more depth. The report found correlations but did not establish clear causality. Further research could provide more definitive guidance around device specifications, availability, etc. to maximize SFI's benefits.
  - Pilot customized professional learning based on educators' baseline digital skills. Given variability in skills, tailoring support may better achieve the goal of enhancing all teachers' abilities to integrate technology effectively. Pilot programs could test differentiated models.
  - Conduct a pilot implementation study of scaling the SFI program at the district/system level. Research the resources, supports and barriers to rolling out SFI to all educators within select partner districts/systems. Evaluate impacts on teaching practices, student outcomes and guidance for continued scale-up.

- **Invest in and measure the impact of Professional Learning Communities**
  - Develop an SFI certification pilot for schools meeting adoption and implementation benchmarks. Certify schools that achieve targets for educator participation rates and levels of classroom technology access. Track impacts on student achievement, STEM enrollment, graduation rates to quantify benefits of certification.
  - Pilot "SFI classrooms of the future" modeled on best practice guidelines. Feature pilot classrooms in marketing research with administrators to understand decision factors for technology investments. Evaluate impacts of highly-resourced classrooms on peer school purchasing behaviors.

- **Innovate - Consider Nontraditional Learning Opportunities**
  - Conduct partnership research blending SFI professional learning with recreational technologies. Study impacts on educator familiarity, classroom integration rates and sales of new product categories. Evaluate benefits of exposing educators to consumer technologies students engage with outside school.

Appendix

Teacher Survey

Demographics

D1 What subject(s) do you teach?

D2 What grade level(s) do you teach?

D3 When did you start using the SFI resources?

D4 How did you first learn about the SFI program?

Technology (T)

T1 What type of devices are your students using for classroom activities?

T2 Which of the following best describes the type of access to devices your students have for classroom activities?

T2a Which of the following best describes the level of access to devices your students have for classroom activities?

T3 The objectives of the SFI program are to promote students' future-ready, innovation skillsets and mindsets, as illustrated in the image below.

T3a To what extent do you agree with the following statements about the capacity and availability of student devices?

- The devices available to my students have sufficient processing power and memory to handle the demands of innovative learning activities.
- The number of devices available to my students is sufficient to facilitate activities that promote innovative thinking.
- The variety of devices available to my students allows them to explore different approaches to problem-solving and learning.The reliability and durability of the devices available to my students allows them to focus on learning without technical disruptions.

T3b What additional devices and resources would empower you to further advance the SFI program and cultivate future-ready, innovative skill sets and mindsets in your students?

Engagement Level & Instructional Support (ELIS)

ELIS1 Please indicate the frequency with which you engage in the following SFI professional development opportunities.

- I attend SFI in-person workshops when they are available.
- I actively apply the information and guidance I gain from SFI professional development opportunities in my classroom.

ELIS2 Roughly how many SFI Starter Packs have you implemented in your classroom instruction? (Enter '0' if you have not implemented any Starter Packs.)

ELIS3 To what extent do you agree with each of the following statements regarding the integration of the SFI Starter Packs into your classroom instruction?

- The SFI professional development opportunities (online modules, in-person workshops) equipped me with the skills to confidently implement the Starter Packs in my classroom.
- The SFI Starter Packs were grade-level appropriate.
- The SFI Starter Packs were aligned with my existing curriculum.
- The SFI Starter Packs were comprehensive and user-friendly for teaching, making them easy to integrate into my existing curriculum.
- The SFI Starter Packs provided sufficient information and guidance for learning new skills and technology.

Impact on Teaching Practice (ITP)

ITP1 To what extent do you agree with each of the following statements regarding the impact of the SFI program on your teaching practice?

- The SFI program has made me more confident in using technology in the classroom.
- The SFI program has prepared me to create technology-infused learning experiences for my students.
- The SFI program has made me more effective in using technology to develop students' innovation skill sets and mindsets.
- The SFI program has made me a more frequent user of technology in my teaching.

Impact on Student Learning (ISL)

ISL1 To what extent do you agree with each of the following statements regarding the impact of the SFI program on your students' learning and engagement?

- The SFI program has helped students gain confidence in using technology for learning.
- The SFI program has increased my students' interest in STEM subjects and/or careers.
- The technology skills I learned through SFI have helped students solve problems creatively.
- The SFI program has improved student ability to collaborate and communicate effectively using technology.
- The SFI program has equipped students with innovation skill sets and mindsets like computational thinking and design thinking.

Overall Experience (OE)

OE1 To what extent do you agree with each of the following statements regarding your overall experience with the SFI program?

- Overall, participating in the SFI program has positively impacted my approach to teaching and lesson planning.
- I would recommend the SFI program to other educators.
- I am excited to continue to deepen my engagement with the SFI program and technology-based teaching.
- I believe I am ready to upgrade our technology to take on more sophisticated technology-based activities.

OE2 Please select the statement that best describes your role in using technology for learning BEFORE and AFTER participating in the SFI program.

- I have little to no exposure using technology in learning.
- I am new to using technology in learning and am building my foundational skills.
- I am comfortable using technology to deliver content and am now focusing on improving the way I design and lead learning experiences.
- I actively encourage innovation and effectively use technology to create engaging and creative learning experiences.
- I guide students in adopting innovative mindsets and prepare them for the challenges of the future using technology-infused learning experiences.

OE3 What was the most significant benefit you gained from participating in the SFI program?

OE4 What were your biggest challenges in implementing the SFI program in your classroom?

OE5 What specific changes would you recommend to the SFI program to better support you in designing and leading learning experiences that empower students to become confident innovators?

Student Survey

SFI SP Refresh

Q10 To help you recall, here are some examples of the SFI lessons you might have gone through. Do note that the SFI lessons your teacher went through might look different from those shown below.

Technology (T)

T1 What type of equipment/devices do you use in school?

T2 What type of equipment/devices do you use outside of school?

Participation and Confidence

PC1 This section of the survey asks you to reflect on how the lessons and activities impacted your participation in class.

- I am more engaged and interested in class activities when we learn and use new technology.
- I felt motivated to learn more about the technology we used in class.
- The technology-based lessons we did in class increased my participation.
- I feel more comfortable and confident using new technology for learning.
- I have used technology and skills I learned in other classes or outside of school,

My Learning

L1 This section of the survey asks you to reflect on how participation in technology-based activities improved your technology skills.

- I am better at working with my classmates and communicating ideas
- The technology skills I learned through the SFI lessons help me solve problems
- The activities helped connect learning to the real world
- The SFI lessons increased my interest in STEM subjects and careers.
- I am a more creative thinker.
- Overall, I love using technology in learning and want to learn more.
- Overall, the learning experience was positive and I would recommend it to other students.

L2 What was your favorite lesson or activity that helped you learn new technology? Tell us why it was fun.

L3 What activity was least interesting? Tell us why you were less engaged?

L4 What technology tools are you most excited to learn more about in the coming year?

Focus Group & Interview Protocol

Meeting Launch

Facilitator: Welcome Participants
Observer: Press Record / Take Notes
Facilitator, Observers, and Participants: Introductions
Facilitator: Confidentiality Statement, Agenda Walk & Expectations

Introduction

Thank you all for participating in our focus group discussion about the Skills for Innovation program. The goal of this session is to understand your experiences and perspectives to help evaluate and improve the program. Please introduce yourself by sharing your name, where you're joining us from, and the subjects/grade levels you teach.

Confidentiality Statement

Before we continue, I want to remind you that this meeting is being recorded for transcription and note-taking purposes. Everything discussed will remain strictly confidential. You have been assigned a participant number instead of using your name, so your identity will remain anonymous. Notes and recordings will only include numbers, not names. Once our research is complete, all information will be destroyed. Please feel comfortable sharing openly without fear of your privacy or identity being compromised. Are there any questions before we begin?

Expectations:

I now want to take a moment to review our expectations for today's focus group.

- **Open and Honest Feedback:** There are no right or wrong answers here. We're most interested in hearing your honest opinions and experiences with the SFI program.
- **Perspectives**: We value a variety of viewpoints! Feel free to disagree with others or share a different perspective on SFI.
- **Sharing Feedback:** We encourage both positive and critical feedback. Let us know what you liked about the program and where you see areas for improvement.
- **Active Listening:** To ensure everyone's voice is heard, please speak one person at a time. This way, we can capture everyone's responses accurately.

Does anyone have any questions about these expectations before we begin?

Discussion Roles:

- Facilitator: Will ask questions (observer will provide support and type question in the chat)
- Participants: Can choose to respond or be invited by Facilitator
- Facilitator: Might ask follow-up questions for clarity.

Focus Group Questions

Implementation Experience:
- Can you tell us about a time you applied the SFI program in your class, and it went really well?
- What are some examples of challenges you faced when implementing the SFI program?
- In terms of lesson plan format, what adjustments or improvements would you suggest to enhance the effectiveness of the SFI program?

Support and Resources:
- Regarding training and resources, what support do you feel would have been helpful during the implementation of SFI?
- Can you share your experiences with SFI professional development courses/sessions? How did these courses/sessions contribute to your understanding and implementation of the program?

Focus Group & Interview Protocol

Student Engagement and Impact:

- How has your students' access to technology in the classroom impacted your ability to apply the SFI program? Are there any tools/devices you wish they had access to that they currently don't?
- How do you assess student progress and learning outcomes when using the SFI program?
- How did you assess your students' readiness to engage with the SFI resources and approach? Did you encounter any challenges in this regard?

Teacher Development and Confidence:

- Can you provide examples of how the SFI program has impacted your approach to teaching methods and lesson planning?
- Thinking back to before you started SFI, how has the program changed your confidence and skills in using technology for teaching, and your overall relationship with technology in general? Can you share any specific examples?

Catch All: Is there anything else anyone would like to share about your experience with SFI that we haven't already discussed?

Closing

- Thank you again for your participation and feedback. Your responses will help strengthen the program for future educators and students.
- As a token of our appreciation for your time today, we'd like to offer you a $20 gift card. If you'd like to receive it at a different email address than what we have on file, please let us know now through the chat or by emailing survey@skillsforinnovation.intel.com.