

User Voice in Technology Decision-Making

Prepared by Working Group I

TOPIC DESCRIPTION

What role does student, teacher, parent, or other end user preferences play in technology decision-making with educational institutions?

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PURPOSE OF THE RESEARCH

Educational technology has the potential to augment and transform learning experiences in schools. User-centered approaches highlight the need to involve those who will be using the products throughout technology design, development, and implementation phases. User-centered design approaches are commonly used in industry and in educational technology development (e.g., United States Department of Health and Human Services, 2006; Simone & Gross, 2017). Similarly, various lines of research underscore the importance of student voice and agency in learning environments (e.g., Cook-Sather, 2006; Mitra, 2004; Smyth, 2006). Despite the importance of user feedback and student voice, relatively little is known about how educational institutions incorporate user voice into educational technology decision-making. The study investigated the role of student and teacher voice in educational technology decision-making in both K-12 school districts and institutions of higher education.

Questions guiding the work included:

- I. How, if at all, do various institutions currently collect user preferences/voice? If so, how are data used in decision-making, by whom, when, and why?
- II. What are some exemplars of how student, teacher, or other end user preferences can be integrated into technology decision making?
- III. What similarities and differences, if any, might exist across institutional contexts (e.g., colleges/universities, K-12)?

BACKGROUND AND LITERATURE REVIEW

Student voice involves the active participation of students in decision-making and change efforts in schools (Fielding, 2001). Incorporating student voice into learning settings has the potential to support positive youth development in terms of agency, belonging, and competence (Mitra, 2004). Student participation can be considered a main avenue to help learners become informed citizens, developing the knowledge, skills, and attitudes necessary for a democratic society (Apple & Beane, 1999). Despite the potential benefit of student voice in decision-making (Mager & Nowak, 2012) and the importance of finding and procuring educational technologies that address specific instructional needs, little is known about student or teacher voice in educational technology decision-making. This project aimed to understand if and how student and teacher voice might be used in educational technology decision-making in K-12 and college-level institutions.

This work builds upon prior research conceptualizing the procurement of educational technology resources in K-12 school districts (Morrison, Ross, & Corcoran, 2014) as well as piloting educational technologies in K-12 schools (Adams-Bass, Atchison, & Moore, 2015). According to Morrison et al. (2014), technology acquisition in K-12 districts can be operationalized by a series of five action points, as shown in Figure 1. The first action point, the allotment of funding, represents decisions about the amount available to purchase ed-tech products in an institution or district. The second action point, the assessment of needs, involves decisions around what learning objectives or challenges exist in institutions to target finding and purchasing of ed-tech products. The third action point, discovery of ed-tech products, involves doing research about the existing ed-tech products that can address identified needs and challenges, and what solution might best fit the particular context. The fourth action point, the evaluation of products, involves gathering evidence

from peer recommendations, research, and/or conducting pilot tests in classrooms to assess the ability for specific products to support the particular instructional needs. The fifth action point, acquisition of the selected products, involves the final decision-making and procurement of the specific resource or tool, which might involve aligning with district and/or state policies. Although the action points are often not linear but overlapping and iterative, the action points are meant to provide a framework for typical practices or pathways during educational technology acquisition in K-12 settings. We based the study around these action points and extended the framework to university settings.



Figure 1. Operational framework proposed by Morrison et al. (2014). Each of the five phases represents action points for educational technology acquisition.

As part of follow-up research focused around how school districts pilot and evaluate ed-tech products (Adams-Bass et al., 2015), data were collected and analyzed from six school districts during the process of selecting and trying out new educational technology products. Results demonstrated the importance of teacher and student feedback throughout the process, and underscored how decisions are often based around teacher feedback on a product. Additionally, results highlighted the maturity and insight from student comments in focus groups, despite the fact that students felt as if their feedback may not be directly used.

CURRENT STUDY

Together, these two reports provide a framework for technology decision-making in learning institutions, and highlight the importance of investigating user voice throughout the process. In this study we built upon the framework by exploring the extent to which user voice was involved at each of the action points. We also sought to extend the framework to college and university settings.

The current study investigated how teacher and student input may or may not be incorporated into the assessment of needs, discovery, evaluation, or acquisition of educational technology products. Goals of the study also included providing examples of how student, teacher, or other end user preferences can be integrated into technology decision-making, and to provide insight into possible similarities or differences that may emerge across institutional contexts (e.g., colleges/universities, K-12). We also aimed to explore if there were different views of user voice or input from various stakeholders within a single institution or district.

HYPOTHESES

We hypothesized that user voice may not play a large formal role in decision-making. However, there may be points where students and faculty have more input than others. Teachers and students may be used in the discovery and/or evaluation of products, but not as much in the acquisition of products. We also hypothesized that there might be disagreement about the level of user input among people in leadership with the decision-making authority and faculty or students at the same institution or district.

METHODOLOGY & PARTICIPANTS

Methodology

The purpose of the study was to explore to what extent educational institutions incorporate user voice in educational technology decision-making; hence a multiple case study design was used (Stake, 1995; Yin, 2003). We aimed for three institutions of higher education and three K-12 school districts to investigate how user voice may or may not be taken into account with educational technology purchasing.

Sites and Participants

Institutions of higher education and school districts were chosen based on connections to working group members. For each case, three people were targeted for interviews: someone in a leadership position with educational technology decision-making power, a faculty member who was well-versed or known for using technology in their classes, and a faculty member who was representative of a normal user of technology for the institution/district. Working group members helped identify and select specific participants.

Data Sources

Data sources included interview data, supplemented by document analysis of school websites. Interview questions were developed from the guiding operational framework from Morrison et al. (2014). For each action point (with the exception of the allotment of funding), interviewees were asked to describe the general process and then follow-up questions asked to what extent faculty or students were involved in the process (see Appendix A for full protocol). For example, for the “assessment of needs” action point, the protocol asked technology decision-makers, “How does your institution determine what instructional needs will be targeted with technologies?” After the description, a follow-up question asked, “to what extent are faculty/students involved in the assessment of needs?”

The interview protocol was slightly modified for faculty to capture if there were any differences between what technology leaders may state and faculty perceptions. Thus, questions became, “To what extent do you feel faculty or students are involved in the assessment of needs?” The protocol also added in questions to capture how faculty themselves go about choosing and evaluating technologies to use in their classrooms.

Data Collection

One researcher conducted 16 interviews with identified participants and conducted document analysis of school websites. In total, interviews were conducted with participants from four universities (two public, two private) and three K-12 districts. Table 1 presents demographic information of the higher education institutions and Table 2 presents demographic information on

participating K-12 districts. Table 3 provides information on the roles of each participant from each institution.

Due to scheduling and time limitations, there was only one interview conducted for one higher education institution and one K-12 school district. Since those institutions only had one participant, they were not included in this report. Thus, the results only present interview data from Universities 1, 2, 3, and Districts 1 and 2.

Table 1

*Demographic information of participating higher education institutions, taken from school/state websites. Note: *denotes institution not used in final results.*

Institution	Enrollment	Description	Average SAT	Percentage non-white students	Cost of attendance (in-state/out-of-state)	Students graduating in 4 years
University 1	~30,000	Land grant institution	553/560/531	26.4%	\$26,000/ \$45,000	32.3%
University 2	~50,000	Public	523/524/not reported	70.6%	\$25,000/ \$43,000	24.0%
University 3	~12,000	Private	660-770 for 50%	25.4%	\$67,000	90.3%
*University 4	~5,000	Private Graduate	N/A	45.1%	\$47,000	N/A

Table 2

*Demographic information of participating K-12 school districts, information taken from school/state websites. Note: *denotes institution not used in final results.*

	Enrollment	Description	Average SAT (reading + math)	Percentage non-white students	Free/reduced price eligible	Total expenditures per student
District 1	215,000	Urban	1247	91%	76%	\$8,675
District 2	1,600	Suburban	1042	11%	14.6%	\$17,198
*District 3	14,000	Primarily rural	1129	38%	28.7%	\$12,818

Data Analysis

The researcher took notes during each interview. Interviews were recorded and transcribed. Interview transcripts were analyzed using a semi-structured coding scheme, driven by the action points in the Digital Promise operational framework. Interviews were also analyzed for examples of how student and faculty voice could be integrated into decision-making, and for any perceived differences in user input among faculty and leadership for each case.

Table 3***Participants and description of role by institution. Note: *denotes institution not used in final results.***

Institution	Participant
University 1	Vice Provost for Information Services Associate Professor
University 2	Senior Director, Learning Innovations Chief Innovation Officer Assistant Director, Learning Environments
University 3	Mobile technology manager Manager, Academic Technologies Learning Designer
*University 4	<i>Director of Academic Technology</i>
District 1	Chief Technology Officer Engineering/Computer Science Teacher Instructional Coach/AP English Teacher
District 2	Technology Director Kindergarten Teacher Kindergarten Teacher, Reading specialist
*District 3	<i>Assistant Director of Instruction</i>

FINDINGS & INSIGHTS

Results begin by describing each institution and associated interviews, then present emergent themes across institutions.

University 1

University 1 is a large, public, land grant institution. Both a Vice Provost and an Associate Professor were interviewed.

Technology Decision-maker. The Technology decision-maker for University 1 was the Vice Provost (VP) for Information Services. The VP provided examples of how faculty voice was included during the assessment of needs, discovery of ed-tech products, the evaluation of products, and to some extent in the acquisition of products (Table 4). The VP provided three different examples that each had slightly different user input, one of which was a large decision about the campus LMS, another from a recent adaptive technologies effort, and other examples of smaller ground-up requests from faculty.

For the large LMS campus decision, the VP cited a very involved process that used faculty and student input at various decision points. A university team first talked to around 20 faculty to understand what they felt were the most important learning objectives, or teaching areas where they would like support. From those interviews the team developed nine key points, such as the

ability to give regular feedback, or the ability for students to pick up missing information. Those criteria were used to evaluate their current system and from an internal review found that their current system was not adequately meeting their learning needs.

From there, a committee of faculty and staff evaluated four potential products. The learning team mocked up a variety of classes so that the committee could evaluate each of the products along the nine criteria. The committee narrowed the four potential products down to two potential products.

The team then set up a comparison trial by setting up eight classes in each LMS system. A call was put out for faculty participation with a \$1000 stipend. Participation included having the LMS for the course redesigned with the help of an instructional designer, and having the class participate in focus groups and surveys. Courses were selected to represent a range of domains and sizes for each LMS group, resulting in eight classes in one LMS system and eight in the other LMS system.

During the comparison the team also solicited both student and faculty input for both of the products, resulting in around 500 respondents weighing in on what they liked, what they didn't like, and assessing each product along the nine criteria.

The VP mentioned that one interesting result of this process was that many students reported favoring the classes that were refined with the instructional designers, regardless of the LMS system. For example, the VP stated that the students said, "They really liked the instructional designers. They didn't care about the product..." (VP, University 1).

This same idea of the intersection with pedagogy emerged when talking about another example of adaptive technologies. When asked about how the team evaluated the effectiveness of the adaptive technologies, the VP stated,

It's really hard to separate out and say the technology made the difference or was it the new teaching methodology that went with it or was it the fact we're given high touch in redesigning the courses? You don't just pop the tool in. You really rethink your pedagogy. (VP, University 1)

For the more recent adaptive technologies effort, the VP held a two-day fair open to the university. The VP invited 10 different vendors to do presentations across the two days, with around 175 people attending. Faculty and staff were able to walk around and try out the various tools, resulting in around 30 faculty trying 10 different adaptive learning tools. The VP stated that at the end of the year they will likely hold forums to narrow down the tools to the ones that they want to roll forward.

Table 4
Summary of user voice for action points by University 1 Technology Decision Maker.

Action point	Faculty Voice	Student Voice
Assessment of Needs	LMS + ground-up	LMS
Discovery of Ed-tech Products	Ground-up	
Evaluation of Products	LMS + ground-up	LMS
Acquisition of Products	Faculty input during evaluation	Student evaluations play a small

	plays a role, depending on technology	role, depending on technology
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Regular Faculty. The regular faculty for University 1 described himself as an Associate Professor of Engineering (AP) who has shifted more recently into developing educational technologies, exploring issues of instructional practice. The AP also cited faculty input for action points of assessment of needs and evaluation of products, and to a lesser extent the discovery of ed-tech products and acquisition of products (Table 5).

The AP started the interview by citing the same LMS transition case to describe processes of educational technology acquisition. However, the AP stated that in general the processes for purchasing or recommending specific technologies were unclear. The AP did think that faculty were involved, that the learning technologies team “finds folks who will be trial users and get their perceptions of that use.” (RF, University 1). However the AP did state that he feels “removed from the processes of how that goes through.” For the use of faculty input on the discovery of ed-tech products, the AP felt it varied by technology. He stated that he was supported to develop technologies that interact with the existing systems, but did not feel that his input had much influence on larger decisions:

My perception as a faculty member is that for types of technologies that are purchased on the university scale, I have very little ability to influence in terms of an individual user requirement. There's just not a lot of motivation for changes to be made on that large scale to accommodate me. (AP, University 1)

When asked about student input for any of the action points, he stated, “Not that I know of, which doesn't mean it doesn't exist.” For the acquisition of products, the AP speculated that budget was the most important factor, and that feedback from faculty does influence the final decisions, but again was not sure about what weight or importance of the faculty input on decision making.

The AP repeatedly voiced concerns about how educational technology is viewed by both staff and faculty:

I think there's a misperception of technology generally, and there's a view that technology is the fixer...before you can get a faculty voice in selecting technology you really need a shared understanding of how technology fits within the learning process. I would suggest that's the first place that we would need to do work, and that faculty are not aligned on that yet.” (AP, University 1)

At the end of the interview the AP again brought up the importance of beliefs about technology with respect to pedagogy and teaching: “In our technology-driven society it's common to view technologies as problem solvers and an alternative way is to view humans as problem solvers and technology as a tool to help that out with [those problems].” (AP, University 1)

Table 5
Summary of user voice for action points by University 1 Regular Faculty.

Action Point	Faculty Voice	Student Voice
Assessment of Needs	LMS + ground up	None

Discovery of Ed-tech Products	unsure	None
Evaluation of Products	LMS + ground up	None
Acquisition of Products	3rd or 4th priority	None

University 2

University 2 is a large public university. Three different technology decision makers were interviewed, but no faculty were interviewed. Participants included the Senior Director (SD) of learning innovations for the University’s Center of Teaching and Learning, the Chief Innovation Officer and head of Instructional Technology (CIO), and the Assistant Director of Learning Environments (ADLE). The Senior Director and the CIO had similar responses; the CIO is presented here with the ADLE.

Technology Decision Maker – CIO. The CIO provided different examples of technologies to portray both top down and bottom up processes of educational technology decision making (Table 6). The CIO started by emphasizing a university-wide push for lowering the cost of education and providing more open educational resources, as well as increasing graduation rates. The top-down approach involved getting technology recommendations from instructional designers and then trying the technologies out, first internally with a mock classroom setups and then eventually with faculty testers and pilot classes. A more bottom-up approach driven by faculty initially starts out through faculty requests but then also goes through the same kind of process of having instructional designers help identify similar technologies, sand boxing, evaluating the tools and then rolling it out for the rest of the university.

The CIO provided an example of a recent top-down digital literacies effort that involved introducing digital literacy skills into the core curriculum. Aiming to get basic understanding of coding and scripting to students, they offered faculty buy-out time to work with instructional designers to incorporate the blogging technologies into freshman English courses. Around 15 faculty participated, which involved refining their courses, delivering the content and then having students take surveys.

A bottoms-up approach that the CIO provided was a specific “digital champions” program that gives small scale grants to faculty who are looking to introduce digital tools and technologies into their classes. The program started with open calls that served a wide variety of faculty needs, and then in subsequent years was shaped around specific areas of interest such as adaptive instruction. Faculty were provided with somewhat of a business plan template to help them estimate what they would need.

The CIO also explicitly talked about using a bi-directional strategy with “go-to” faculty members. A cited example was with very enthusiastic economics professors who wanted more visual techniques and resources. The Center worked with them to provide targeted pedagogical support in exchange for developing some open resources that they wanted to push out to the department. By targeting clinical faculty, the CIO stated that, “if we get them [clinical faculty] to adopt it and find the right solution it will become the department level because they teach all those freshmen

sections for the most part.”

In terms of student input, the CIO stated that students are involved in the evaluation of products through the technology fees. Every student at the university has to pay technology fees, which fund digital and physical technologies such as computer labs, classroom spaces, and new makerspaces. All proposals for technologies have to be approved by a student committee. So the student committee has the power to prioritize certain initiatives over others. For instance, the student committee wanted digital maker spaces so the university is building a new maker space this year.

Table 6

Summary of user voice for action points by University 2 Technology Decision Maker - CIO.

Action Point	Faculty Voice	Student Voice
Assessment of Needs	Solicited + Ground-up requests	
Discovery of Ed-tech Products	Ground-up requests	
Evaluation of Products	Classroom testing	Student Innovation Fellows/Committee
Acquisition of Products	Faculty and Staff committee for purchasing	Student Committee for technology fees

The CIO also described a program where students are “Innovation Fellows” in the Center for Teaching and Learning Excellence. The student fellows assist with many of the technology initiatives, either as assistants to the instructional designers when they go out to help faculty redesign their course or making improvements to physical technologies. The CIO stated that the student fellows are “great resources because they give us lots of feedback.”

Technology Decision Makers – Assistant Director of Learning Environments (ADLE). The ADLE’s responsibilities focus on physical learning tools within classroom and laboratory environments. His team “includes audio-visual engineers and learning space design experts, classroom and event support professionals, as well as people who run our Open Access Technology labs.”

Table 7

Summary of user voice for action points by University 2 Technology Decision Maker - ADLE.

Action Point	Faculty Voice	Student Voice
Assessment of Needs	Faculty surveys of needs, outreach	Student focus groups, web presence, student committees
Discovery of Ed-tech Products	Input on activities instead of specific products	Input on activities instead of specific products
Evaluation of Products	Faculty surveys	Little to no student evaluation
Acquisition of Products	After cost, ease of use, security	

The ADLE described faculty voice in the assessment of needs through faculty surveys and outreach:

We do a number of faculty surveys and outreach to try to gain some information about what are the top important qualities within classroom design to faculty at large either from faculty from the business or the college of arts and sciences, things like that. What are some of the things that you find most important within classroom spaces? You know white boards, large display screens, movable furniture, things like that. Then we take that and synthesize it in this committee and usually my team will put together a design.

The ADLE gave an example of a recent effort around makerspaces as an example of both faculty and student input in the assessment of needs. When soliciting needs from faculty, they realized that there was a growing consensus around the need for spaces to support more hands-on approaches:

Going and talking with those professors, their departments, realizing that holy crap we have a really big need on this campus for some experiential hands-on spaces that are not being provided by the university. That's kind of how we started the project, but then realizing that this really needs to be a student-driven, bottom-up decision on how this gets built out.

The group put together a number of student focus groups as well as a web presence for gathering information for what students might want to see and do in a space like this. A student group was so interested and willing to be involved, the ADLE used them to garner student voice within the ideation of this space. The ADLE also asked a couple of departments to nominate three or four students to serve on a steering committee for the makerspace. The group consisted of about 10 students, met with architects and gave feedback on exactly what they would like to see within the space.

For the discovery of ed-tech products, the ADLE described how he typically tries to get faculty to focus on giving input into the kinds of activities or functionalities that they would like in a classroom instead of specific technologies:

We try to keep the general ideas on the table about what the needs are as generic as possible. We don't want to go in and tell people, "Hey do you want the Barco NCN 100 or the WePresent W3-2500 device? Which one would you like?" We kind of say, "Would you like wireless presentation in your classrooms?" Or, "What kinds of connections would you like to have," or "what do you try to do in your classroom?" We try to make it very activities-driven, trying to make sure we understand what are the kinds of scenarios that faculty find themselves in that they wish they had technology either to emphasize or complement what they're doing. Then we go as an IT group/learning technologies group to go to find the best tool for the job.

Similarly in the makerspace project, the ADLE guided students to focus on activities instead of specific technologies. For example, the ADLE stated, "Sometimes those model-level decisions, those specific brand-name or manufacturer that we go with is something we decide, but then what the actual, what this thing needs to do is often decided by our users."

Although the ADLE stated that in reality faculty input is often behind factors like cost, ease of use,

security, and compatibility for final decisions on technology acquisition, the ADLE also stated the importance of pedagogy driving technology decision-making:

There always is going to be maybe 5-10% of faculty who want a technology-driven solution rather than a pedagogy-driven solution. I think there will always be a small balance there, but for the most part, for the vast majority of our decisions, we try to align what technologies we're buying with what activities faculty want to do and encourage people to think in new ways about how they deliver their courses, what types of use cases and activities they want to do in the space.

University 3

University 3 is a medium-sized private university. Three different technology decision makers were interviewed, but no faculty were interviewed. Participants included the Manager of Academic Technologies (MAT), Mobile Technology Manager (MTM), and a Learning Designer (LD), all within the Instructional Technology organization. The MAT and the LD had similar responses; the MAT is presented here with the MTM.

Technology Decision Maker – Manager of Academic Technologies (MAT). The MAT described the position as focused on research and exploration of educational technologies: “Not formal research, like PhD faculty do, but investigation and exploration of teaching technology that we think could be very useful to faculty and students.” The MAT described a formalized process, the “innovation pipeline,” that begins with his staff exploring technologies from various media outlets and blogs. The team prepares a short report that is used by management to decide whether or not to dedicate more staff resources. If management decides to continue, they then identify potential faculty to try out the technology and estimate resource requirements. The MAT has a small amount of discretionary funds available for these small pilots, and if needed they can ask for more. The next phase is an assessment with faculty in a for-credit class situation, and then developing a more formal business plan that addresses the sustainability of the system.

The MAT expressed moderate use of faculty voice throughout the process. When specifically asked about faculty involvement in the assessment of needs, the MAT states that when they see a need, they “reach out” to confirm the need, or act as a consultant for faculty needs that might arise. The MAT also pointed to faculty needs addressed by connections between people in the Office of Instructional Technology and staff under the Center for Teaching and Learning (CTL) under the Provost’s office. The MAT stated that having one OIT staff situated within the CTL fosters collaboration and communication so that if there are faculty needs that arise out of CTL activities, the OIT can help address these needs.

A stronger level of faculty voice was incorporated during the evaluation of products, where faculty are asked to try out technologies in their classrooms. The MAT stated that he would like to have more rigorous methods of evaluation but that they don’t have the expertise or the facilities (like experimental classrooms to observe unobtrusively). They collect anecdotal data from faculty and students about their opinions on whether or not it worked in their classes. However, the MAT brought up a new program where Ph.D. students who graduate in five years are guaranteed a one year postdoc position. The group was looking into having postdocs with specific qualitative and quantitative skills assigned to help conduct more evaluative research.

In terms of product acquisition, the MAT stated three clear criteria that guide product decisions. First, they “look for solutions that are compatible with our strategic direction for our IT infrastructure.” Second, they hope to support effective teaching:

We also want tools that foster best practices as defined by our Center for Teaching and Learning here on campus. So, we don't want to tell faculty how to teach, but at the same time, we want to make sure that our work is compatible with our colleagues in the Center for Teaching and Learning and that it doesn't work in counter to the best practices they're trying to foster on campus.

The third criterion identified was ease of support, not only by their group but also the larger university community.

Table 8
Summary of user voice for action points by University 3 Technology Decision Maker - MAT.

Action Point	Faculty Voice	Student Voice
Assessment of Needs	Outreach to check with faculty	None
Discovery of Ed-tech Products	Minimal – mostly IT group	None
Evaluation of Products	Classroom Testing	Minimal
Acquisition of Products	Minimal – infrastructure, pedagogy, ease of support	None

Technology Decision Maker – Mobile Technology Manager (MTM). The Mobile Technology Manager’s responsibilities involved initiating projects and other activities that involve mobile technologies. Table 9 describes the stated faculty and student input at various action points. The MTM described the overall process as looking for existing issues that they can solve, either through mobile technologies or some other solution. The MTM tries to involve vendors as early as possible to get demo units for free to test out amongst the team. Once the product has been initially tested, then the team tries to engage the customer, either students or faculty. However, the MTM did caution against involving faculty or students too early in the process, “because if you start bringing in the end user, or the department, or whoever we're trying to work with really early, they can get frustrated if the product doesn't work, or it's really not a good fit.”

Table 9
Summary of user voice for action points by University 3 Technology Decision Maker - Mobile Technology Manager (MTM).

Action Point	Faculty Voice	Student Voice
Assessment of Needs	Observations, conversations with students	Observations, conversations with students

Discovery of Ed-tech Products	Minimal	Minimal
Evaluation of Products	Anecdotal faculty feedback	Log files to check performance
Acquisition of Products	None	None

The MTM identified close collaboration with faculty to identify needs, because “it's having a relationship with faculty, typically, and listen[ing] to them, and observing how they work, and sometimes you'll know they have a problem before they do.” The MTM also provided an example of a recent student-centered app implementation where they tried to spend a lot of time talking to students, where they “are always asking, ‘What do you like about it? What do you hate about it? Does it actually help you during the day? Does it make it harder?’ and we try to suss out problems that way.” When asked if they conducted more formal focus groups, the MTM responded, “We know if we try to do an actual focus group, and have lunch, and do it, nobody's gonna show up. We have to do it on a micro level every day.”

The MTM also described a tension with faculty- and student-driven needs in terms of being able to identify their own problems:

Sometimes we can't entirely rely on that [students identifying what they need], only because students don't always know what they don't know. The same goes for faculty. They don't really know what they're missing out on. We can't always just wait for faculty or students to knock on our door and say, "I need something better." We have to go find that. That can help accelerate how faculty adopt technology, and keeps us busy.

As well as tension between student and faculty needs:

For example, we're doing work in evaluating a new Lecture Capture tool, and there's student interest in that, but a lot of the requirements that we're trying to evaluate these tools against are really coming from the faculty side. I need to be able to shoot this one blast and share it with different teachers. I need to be able to replicate the content between semesters. Students don't care about that. It's really something the faculty says, "I have to have this." Honestly, the students, I think, will be happy with Lecture Capture in really whatever form we give it. For the faculty, they're the ones who are investing their time, and are buying into this trust of having their lectures recorded, which is very new for a lot of them. That is all happening at the faculty level. It really depends based on the product.

For the acquisition of products, the MTM listed that price is the most important factor, along with integration with the existing enterprise systems. The MTM also listed peer usage and peer evaluation (by other private institutions). He stated that if he has a colleague at another university that has had a solid experience with the tool, he is more likely to champion the use. Faculty or student input was not explicitly mentioned as factoring into decision-making.

District 1

District 1 is a very large, urban school district. The Chief Technology Officer (CTO), an Engineering/Computer science teacher (ECS), and an Instructional Coach/AP English teacher (IC)

were interviewed.

Technology Decision Maker – Chief Technology Officer (CTO). The CTO described his position as being responsible for all technology in the district, or “anything that basically plugs in wall reports to me.” He focused on a recent 1:1 initiative to ground the questions about the acquisition process. As part of the 1:1 initiative, the district created a cross-functional team of curriculum, communication, and technology leadership that come together for all technology decision-making requirements. The CTO emphasized that no decision is ever made alone, that decisions are made “through the lens of involving principals. It’s through the lens of involving the Technology Infrastructure Team. When it’s appropriate we’ll get feedback from principals, when it’s appropriate we’ll get feedback from students, but ed-tech by itself will rarely, rarely make a decision without involving a broad group of people.”

When asked about faculty involvement in the assessment of needs, the CTO stated, “I think that we solicit and we get suggestions. I think that’s an area that we could really do a lot of improvement on. I think the challenge is that we are a huge district.” He went on to state that they rely heavily on principals to voice the concerns of the teachers.

Table 10
Summary of user voice for action points by District 1 Technology Decision Maker – Chief Technology Officer (CTO).

Action Point	Faculty Voice	Student Voice
Assessment of Needs	Soliciting suggestions, but pointed at need for improvement	Needs improvement
Discovery of Ed-tech Products	Minimal	None
Evaluation of Products	Piloting in classrooms, test scores	Informal feedback from pilots
Acquisition of Products	Taken into account after cost	Feedback from pilots

Go-to Teacher: Engineering/Computer science teacher (ECS). The Go-to teacher for District 1 identified herself as a high school computer science and engineering teacher. She stated that she uses a variety of advanced technologies for her classes. For all action points, she stated that she felt that she had a very strong voice (Table 11), and mentioned that she had a small amount of discretionary money that she was able to use to buy resources for her class. The PLC meetings within the math department served as a place for faculty to convene and make requests as a department to get technologies in their classrooms.

In terms of student voice, the ECS stated that there was minimal involvement of students for evaluation and acquisition of products, but that the school hosts an annual student technology conference where students present technologies that they would like to see used in their classrooms. The teachers can then choose whether or not to take the suggestions into their classrooms.

Table 11

Summary of user voice for action points by District 1 Go-to Teacher – Engineering/CS (ECS).

Action Point	Faculty Voice	Student Voice
Assessment of Needs	Strong	Some – student conference
Discovery of Ed-tech Products	Strong	Student conference and ground-up
Evaluation of Products	Strong	Minimal
Acquisition of Products	Strong	None

Regular Teacher: Instructional Coach/AP English teacher (IC). The IC teacher also talked about the district’s large 1:1 effort as an example of technology purchasing processes. In contrast to the ECS teacher, the IC teacher felt little agency or ability to influence technology decisions, “it’s very rare that we are able to get money that’s allocated for that kinda stuff. It’s very much a wishlist driven kind of thing.” The IC stated that in order for her to use a SmartBoard, she had to go to a math teacher’s classroom, “I would actually have to borrow it and beg, borrow, steal from the math.”

When asked about the extent of faculty involvement of the assessment of needs, the IC stated, “I think that it tends to be large scale surveys that they rely upon or exit interviews of teachers who are leaving the district. It’s sad, but it’s very true. They listen to people who are leaving.” In contrast to the ECS example, she noted that in the past they have been able to get at least one program from the English PLC meetings for anti-plagiarism software.

The IC teacher did mention that she evaluates software by trying it out in her own classroom. “I need to see what you did with this and sometimes the ends don’t justify the means because it’s a lot of bells and whistles. But, what was gained? Did they learn? Did it meet the objective? So, that’s when you kind of ... That’s when I’ve not decided to continue with some technology.

Table 11

Summary of user voice for action points by District 1 Go-to Teacher – Engineering/CS (ECS).

Action Point	Faculty Voice	Student Voice
Assessment of Needs	Minimal	None
Discovery of Ed-tech Products	Minimal	None
Evaluation of Products	Minimal	None
Acquisition of Products	None	None

District 2

District 2 is a smaller, suburban district. The technology decision-maker interviewed was the

district Technology Director (TD), the go-to teacher involved was a former Kindergarten Teacher and current maker education specialist (ME), and the regular teacher was a Kindergarten teacher, and Reading Specialist (KT).

All three of the involved parties indicated strong faculty involvement at every step of the process. The ME identified other ways that students and parents were involved in the discovery of technology through out-of-schooltime clubs and activities. Otherwise the student involvement was relatively minimal across the board.

SUMMARY

In general, across all cases there was a relatively high level of stated faculty input for each of the action points, but less stated student input for each of the action points. Table 12 displays a summary of the levels of input for faculty and student, by interviewee.

How do institutions collect user preferences/voice?

Across both university and K-12 settings, faculty input was most strongly used for the identification of needs and in the evaluation of products. Faculty input was still important but reported use was lower for discovery and even less for acquisition of products. Student input followed similar trends, albeit participants in general reported less use of student feedback. Student input was most reported in the assessment and evaluation of products, and relatively less for the discovery and minimally for the acquisition of products.

Table 12

Summary of levels of faculty and student input for each interviewee. Red represents a strong stated level of input, pink represents minimal stated input, and white represents no stated input.

Interviewee	Faculty Input				Student Input			
	Assess	Discover	Evaluate	Acquire	Assess	Discover	Evaluate	Acquire
Uni 1-VP	Red	Red	Red	Pink	Pink		Pink	
Uni 1 - AP	Red		Red	Pink				
Uni 2 - CIO	Red	Red	Red	Red			Red	Red
Uni 2 - ADLE	Red	Red	Red	Pink	Red	Pink		
Uni 3 - MAT	Red	Pink	Red	Pink			Pink	
Uni 3 - MTM	Red	Pink	Pink		Red	Pink	Pink	
Dist 1 - CTO	Pink	Pink	Red	Red			Pink	Red
Dist 1 - ECS	Red	Red	Red	Red	Pink	Pink		
Dist 1 - IC	Pink	Pink	Pink					
Dist 2 - TD	Red	Red	Red	Pink				
Dist 2 - ME	Red	Red	Red	Pink	Pink	Red	Red	
Dist 2 - KT	Red	Red	Red	Pink				

Similar to other studies (Adams-Bass et al., 2015), participating universities and K-12 districts stressed the reliance on faculty input during the process. Many participants stated that positive

faculty feedback from pilots is necessary to move forward with purchasing products. However, participants also stated that feedback from both faculty and students was often informally collected, and participants recognized the need to have more formalized systems of evidence collection.

Exemplars of user voice in technology-decision making

University 1 provided an example of how both student and teacher input can be gathered for large-scale technology decisions like the LMS transition. Having an open comment period for both students and teachers helped to cultivate more open communication lines for feedback. Similarly, the student technology presentation fair from District 1 provided an interesting example of how student input can be captured for both the assessment of needs and the discovery of products. However, the relative lack of student input stresses the importance of creating new ways to gather and use student feedback within educational technology decision-making.

Similarities and differences across university and K-12 districts

Similarities across districts included similar reported use of student and faculty input at the various action points. Another similarity included differing opinions among faculty and administrators, and sometimes differing perceptions among faculty. For University 1, the faculty member perceived different levels of faculty input than reported by the administrators. For District 1, both teachers reported different levels of perceived input or agency in the process. Although this is likely to change depending on the particular faculty and administrative participants as well as by particular products, the differences underscore the importance of transparency and communication during educational technology decision-making.

Differences across K-12 and university contexts included participating universities having some kind of center of learning or teaching, where staff and leadership typically had the time and experience needed to find and use published educational research or be able to conduct more refined pilots and studies in classrooms. In the participating districts, technology leadership typically had multiple job responsibilities with little bandwidth to be able to devote to discovering research or collecting and evaluating multiple sources of data during pilot evaluations.

Limitations

A large limitation is that participants were selected based on relationships with working group members. The working group members were selected because they come from institutions or organizations recognized for leadership in educational technology, and many of the partners already work or have worked with Digital Promise. With this biased sample, the participating institutions are more likely to incorporate student and teacher voice into ed-tech decision-making, and results are likely skewed favoring more user voice. Thus, findings are not representative of the larger population of universities and K-12 school districts.

Another limitation is that only one faculty member participated at the university level. Although the stated level of faculty input was similar across the university-level participants, more faculty interviews would provide evidence to reinforce those trends.

IMPLICATIONS & RECOMMENDATIONS

In general, participants all underscored the value of having both student and faculty input during technology decision-making. Overall, the main recommendation is for institutions to develop more ways to collect and incorporate student voice, as findings revealed the relatively little use of student feedback. All participants also stressed the importance of actually trying the products out in their own particular context, as well as the reliance on peer recommendations across both faculty and leadership. The results highlight the amount of testing that is currently being done in classrooms in both K-12 and higher education institutions. If there was a way to collect more formal evidence or data in classrooms, that information and data could be valuable for researchers to analyze and share across institutions. Similarly, if there was a way to capture the classroom pilots and give that information back to the product developers, it could potentially be helpful for the ed-tech companies.

Results also underscore implications for teacher education and professional development programs. Teacher education and professional development programs need to provide more opportunities for preservice and inservice teachers to practice finding, piloting, and evaluating technologies, as well as more opportunities to understand important criteria with which to evaluate technologies. Results also highlighted the need for teacher education and professional development programs to focus on creating a shared understanding of pedagogy-based technology use instead of purely technology-focused use (e.g., Koehler & Mishra, 2009), as well as ways to incorporate more student feedback and voice into pedagogical and technological decision-making.

Recommendations

To encourage faculty voice, recommendations include:

- *Use faculty input to find instructional challenges to address.* University-level administrators reported having workshops and drop-in hours for faculty to bring their problems or needs. Internal mini-grants and RFP's also provided motivation for faculty to bring instructional challenges and work on addressing them with the help of the leadership. Resources such as those provided by Digital Promise (<http://edtech.digitalpromise.org/identify-need/>) can help leaders and administrators use faculty voice to identify instructional needs.
- *Create opportunities for faculty to share what technologies they use with each other to promote faculty voice in the discovery of technology solutions.* Examples provided included mini-conferences where faculty presented technologies they had tried out and used in their classes. K-12 teachers voiced the desire for more professional development time during the school year to be able to connect with each other around working ed-tech approaches.
- *Gather data from faculty during pilots and evaluation of products.* Resources from Digital Promise (<http://edtech.digitalpromise.org/collect-data/>) can also help leaders think about different ways to capture feedback (e.g., focus groups, surveys, etc.) depending on the size/context of the implementation.
- *Include faculty on decision-making boards or groups to encourage input on technology acquisition.* Technology committees that include faculty and teacher representatives provide an avenue for faculty to provide their input during final decision-making processes.

Similar recommendations to incorporate student voice include:

- *Use student input to find instructional challenges to address.* Empowering students to help identify learning needs both encourages student development of self-monitoring skills and promotes student voice in articulation of instructional challenges. Given that students can demonstrate great insight and maturity in their learning needs (e.g., Adams-Bass et al., 2015), creating avenues for students to identify challenges (such as surveys or focus groups) can promote student voice.
- *Create opportunities for students to share what technologies they already use to promote student voice in the discovery of technology solutions.* Examples include technology fairs where students present technologies they would like to see in their classes. Less formal examples involve faculty incorporating student-led approaches into their classes, carving out small amounts of time during class to have students share different technologies or solutions they may be using to complete class activities.
- *Gather data from students during pilots and evaluation of products.* The same resources from Digital Promise (<http://edtech.digitalpromise.org/collect-data/>) can help leaders capture student feedback in similar fashion to faculty feedback. Student-run technology help desks are another example of how students can be involved in the evaluation of products. Some institutions use students to provide the first-level IT support to promote development of technological skills, which can provide valuable information for lifecycle or usability issues.
- *Include students on technology committees to encourage input on acquisition.* Technology committees that include student representatives enable students to provide input on technology purchasing decisions.

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Appendix A: Interview Protocol

Section 1: Technology Decision-Makers

Thank you for agreeing to talk to us about user voice (teachers, students) in educational technology decision-making. We have a few questions that we would like to ask you.

1. Can you briefly tell us about your position in your institution/district?
2. Can you please briefly describe generally how your institution purchases educational technologies and/or recommends specific technology use?
3. How does your institution determine what instructional needs will be targeted with the technologies?
 - a. To what extent are teachers/students involved in the assessment of needs?
3. How do you investigate appropriate technologies or conduct research on current solutions?
 - a. To what extent do you solicit teacher/student recommendations?
4. How do you evaluate the effectiveness of technologies in the classroom?
 - a. Do you try out the technologies in classrooms before making a final decision?
 - i. If so, how do you choose what classrooms or teachers to use?
 - ii. Do you observe students using the technologies in the classroom?
 - b. To what extent do you collect feedback from teachers?
 - c. To what extent do you collect feedback from students?
5. What factors play an important role when you are making final decisions on technology purchases?
 - a. To what extent do you factor student voice?
 - b. To what extent do you factor in teacher voice?
 - c. To what extent do you factor in efficacy research?
 - i. If so, how do you judge the quality of research done?

Section 1: Teachers/Faculty

Thank you for agreeing to talk with us about user voice (teachers, students) in educational technology decision-making. We have a few questions that we would like to ask you.

1. Can you briefly describe your teaching background (how long you have been teaching, what subjects, how much technology you use in your classes)
2. Can you please briefly describe generally how you think your institution purchases educational technologies and/or recommends specific technology use?
3. How does your institution determine what instructional needs will be targeted with the technologies?
 - b. To what extent do you feel teachers/students are involved in the assessment of needs?
3. How does your institution conduct research on appropriate technologies?
 - b. To what extent do they solicit teacher/student recommendations?
4. How does your institution evaluate the effectiveness of technologies in the classroom?
 - d. Do they try out the technologies in classrooms before making a final decision?
 - e. To what extent do you feel they use feedback from teachers and/or students?
5. What factors do you think play an important role when leaders are making final decisions on technology purchases?
 - d. To what extent do you feel they factor in student or teacher voice?
6. Now can you please describe how you yourself go about choosing what technologies to use in your classroom?

7. How do you go about investigating effective technologies?
 - a. To what extent do you use other teacher recommendations?
 - b. To what extent do you use student recommendations or feedback?
8. How do you evaluate the effectiveness of technologies in your classroom?
 - a. To what extent do you use student data or student voice?