Report on Technology Use by Teacher Education Faculty for Teacher Preparation Purposes

Indiana University School of Education–Indianapolis

Introduction

This report details the findings of the self-reported technology use in the undergraduate Teacher Education Program in the Indiana Univesity School of Education–Indianapolis (IUPUI). The survey, created with the online survey tool Qualtrics, was sent out to 38 tenure-track, clinical, and contingent faculty. We received 17 responses total for a response rate of 44.74%. This is an acceptable response rate under "liberal conditions" (Nulty, 2008).

This survey provides data to explore the following questions:

- What technology tools are used by IUPUI teacher education faculty?
- For what purposes is technology used by IUPUI teacher education faculty, and what factors contribute to the success of those purposes?
- What practices do IUPUI teacher education faculty draw upon to teach with technology, and what practices would faculty like to further develop in the future to support teacher candidates' use of technology?

Each of these questions will be explored in turn, followed by future directions to further support the use of technology that will be taken by the IUPUI Teacher Education Program based on this data in order to better prepare teacher candidates to teach in the contemporary urban classroom.

What Tools Do You Use to Teach with Technology?

IUPUI teacher education faculty were asked to name the technology tools, services and software that they make use of in their classes with undergraduate teacher candidates. These free-form text responses were coded into categories. The categories, listed in *Figure 1*, can be seen as falling into two categories: **Major** (receiving 4 or more mentions) and **Minor** (fewer than 4 mentions).

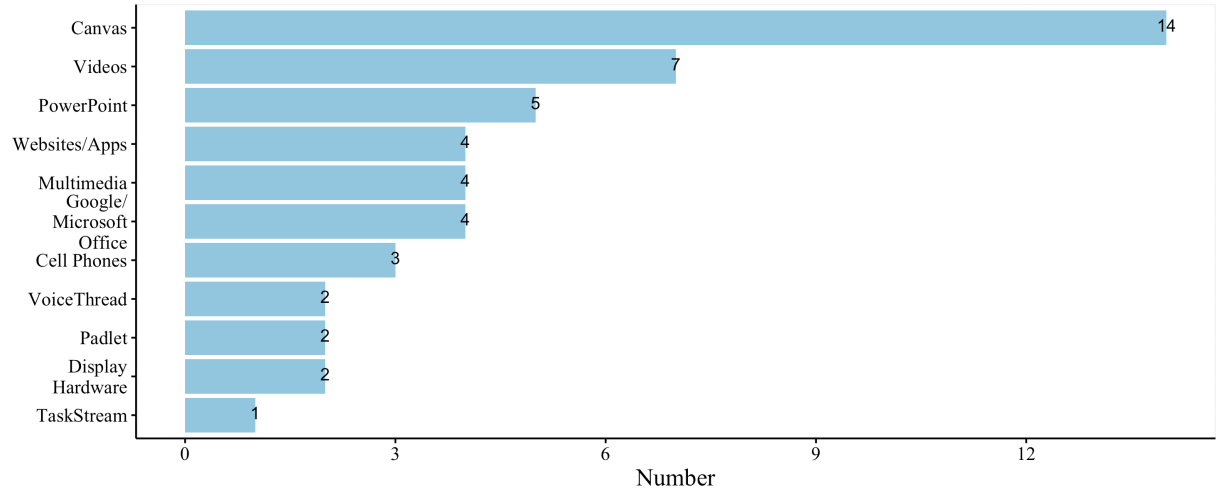

Figure 1: Coded technology tools

Among the **major technologies**, Canvas, IUPUI's chosen Learning Management System (LMS), is the most widely used tool with 14 faculty members identifying it as a technology tool that they use. This is not suprising given that faculty are, at the very least, required to post their syllabus on Canvas; most faculty also use Canvas to distribute readings and to collect and grade assignments. Canvas was followed by videos–such as videos explaining subject area content or educational topics or ideas and providing models of teaching–with 7 identifications. Microsoft PowerPoint (5 identifications), followed next. Specific websites and online applications and services, multimedia tools (such as the audio editing app Audacity), and Google Docs/Microsoft Office Suite (excluding PowerPoint) were each identified by 4 faculty

The **minor technologies** received fewer identifications, although were significant nonetheless. The first minor technology noted refered to the use of the teacher candidates' own cell phones (3 mentions). This is a potentially powerful form of modeling allowing these teacher candidates to make use of the technological capacities and capabilities that their students are already in possession, therefore building an asset–rather than deficit–approach to technology in education. VoiceThread (a multimedia presentation and dialogue tool) and Padlet (a virtual corkboard-and-sticky note app) each received 2 mentions. The use of document cameras, projectors, and interactive white boards also received 2 mentions. Lastly, TaskStream, an online portfolio and data analysis system, licensed by IUPUI, received 1 mention.

For What Purposes Do You Use Technology?

The use of technology is ideally a purposeful pursuit, even more so when teaching future teachers to use technology in their own classrooms. This section of this report explores the purposes that the IUPUI Teacher Education Faculty identify in using technology, as well as key factors that influence the success of these purposes in their courses.

A Priori Purposes

Faculty were asked to select from a list of 8 purposes the reasons they used technology in their courses. The number of faculty selecting particular purposes can be found in *Table 1*.

Table 1. Identified technology purposes

Purpose	Number
Direct Communication	17
Dialogue and Discussion	16
Dissemination of Materials	16
Formative Assessments and Student Feedback	14
Curation and Creation of Knowledge	12
Presentation Slides	11
Research	7
Elicit Prior Knowledge	5

All 17 faculty members identified Direct Communication (such as emailing or texting students) as a purpose, followed closely by Dialogue and Discussion (16), Dissemination of Materials (such as through the LMS Canvas, 16), and Formative Assessments and Student Feedback (14). These top four purposes can be categorized as "Course Business" type purposes, ensuring that the course runs efficiently and effectively.

A second group of less identified purposes included Curation and Creation of Knowledge (12), Presentation Slides (11), Research (7), and Elicit Prior Knowledge (5). These purposes are more concerned with direct student learning for the purposes of modeling teaching with technology. All of these purposes emerge directly from constructivist approaches to teaching and learning and are featured prominently in the National Educational Technology Standards for Teachers. The one exception is Presentation Slides, which connotes a more direct form of instruction; Presentation slides could be seen as a "Core Business" purpose and is recognized as both necessary and as a part of a typical teacher's pedagogical toolkit.

Influences on Enacting Technology Purposefully

Self-Reported Success

Faculty were asked to indicate the success of incorporating technology for each *a priori* purpose they selected on a scale from 0 to 100 (not at all successful to very successful,

see *Figure 2*). Faculty rated most of the "Core Business" purposes as being rather successful, including Direct Communication, Dissemination of Materials, Formative Assessment and Student Feedback, and Presentation Slides, with the reported mean success for each of these purposes falling well above the overall mean for success. The one exception is Dialogue and Discussion, the mean for which fell just above the overall mean. Elicit Prior Knoweldge was rated as a highly successful purpose, while Curation and Creation fell just under the overall mean, and Research fell well below the overall mean. Overall, this results in a high degree of skewing to the left (-0.92).

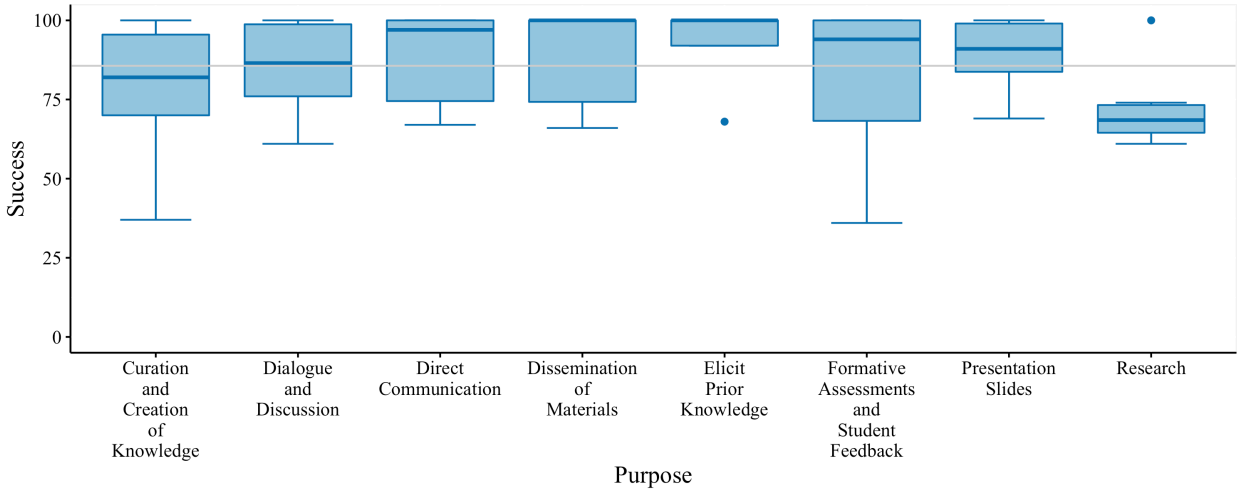

Figure 2. Self-reported success of purpose categories.

Self-Reported Frequency

Faculty were also asked to report on the frequency of which they incorporate technology for each *a priori* purpose they selected on a scale from 0 to 100 (not at all to very frequently, see *Figure 3*). Faculty self-reported a fairly high frequency, rating most of the Core Business purposes (Dialogue and Discussion, Direct Communication, Dissemination of Materials, Presentation Slides) above the overall mean. This results in a high degree of skewing to the left (-1.03). The faculty rated Formative Assessments and Student Feedback, on the other hand, just below the overall mean. They also rated Curation and Creation of Knowledge and Elicit Prior Knowledge just above the overall mean, but rated Research well below the overall mean in terms of frequency. There were a number of outliers, particularly with respect to Direct Communications and Dissemination of Materials.

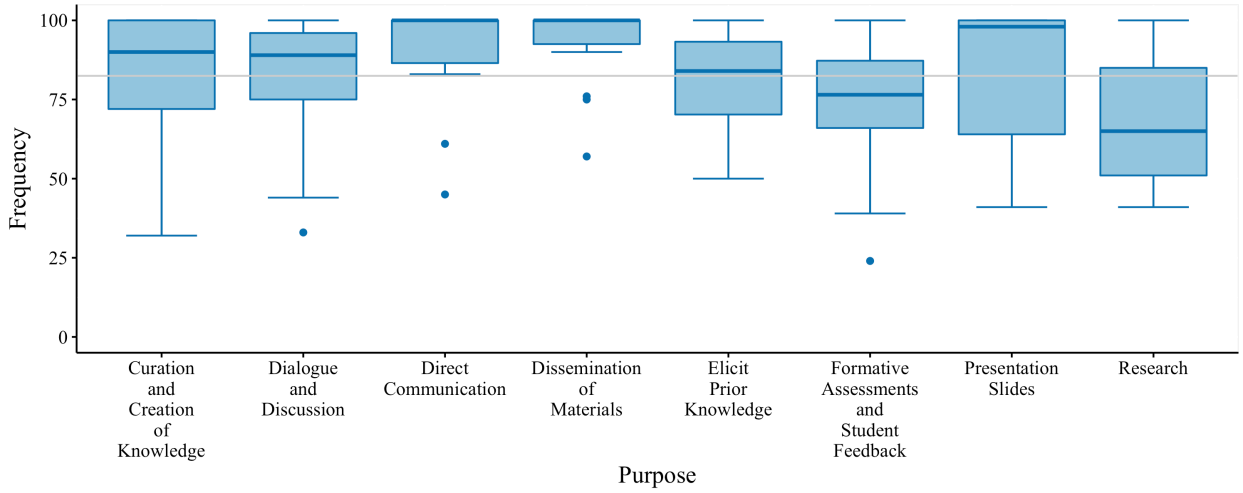

Figure 3. Self-reported frequency of purpose categories.

Perceived Support

Lastly, faculty were asked to indicate the perceived support they receive for incorporating technology for each *a priori* purpose they selected on a scale from 0 to 100 (not at all supported to very supported, see *Figure 4*). Similar to the Frequency measure, there were a number of outliers across almost all of the categories of purposes. The overall mean was relatively high, and the mean for all purposes with one exception was reported to be above the mean.This results in a very high degree of skewing to the left (-1.58). The exception was Research, with the mean for perceived support falling just below the overall mean. It should be noted that Research and Curation and Creation of Knowledge were reported in a way so that these two categories exhibit wide ranges of self-reported perceived support.

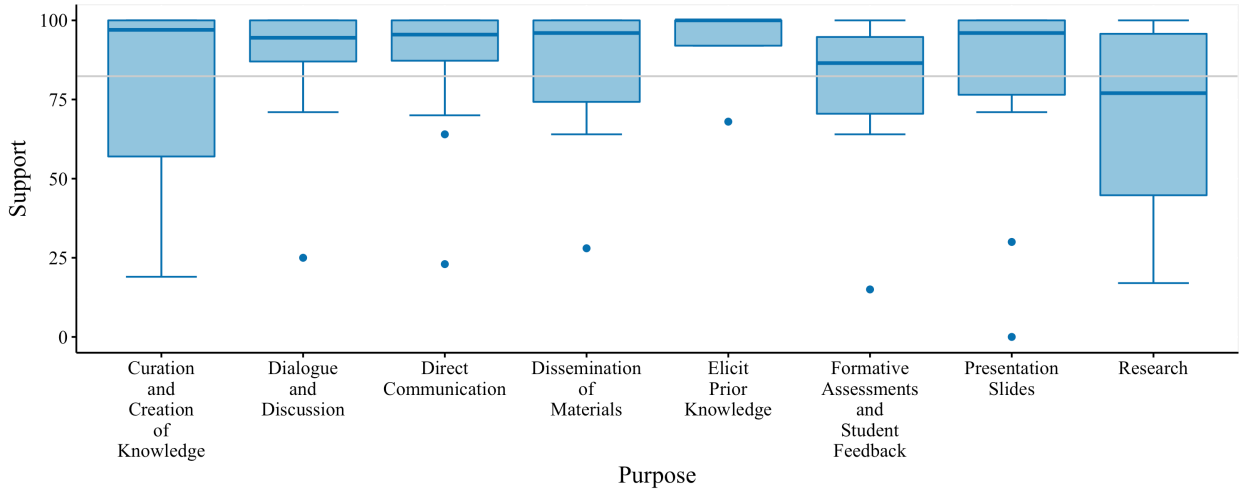

Figure 4. Self-reported support of purpose categories.

Relations Between Factors

In order to understand the relationships between these factors in terms of self-reported success of technology integration, several factors were graphed against each other. A linear regression was calculated for each of these relationships.

Support and Frequency of Technology Use

The first relationship examined is the potential relationship between the ratings of perceived support and the self-reported frequency of technology use (*Figure 5*). The assumption with this test is that better supported faculty will be more likely to use technology more frequently. It was found, however, that perceived support is not a statistically significant predictor of frequency of use, $b = 0.09$, $t(87) = 1.03$, $p < 0.3$.

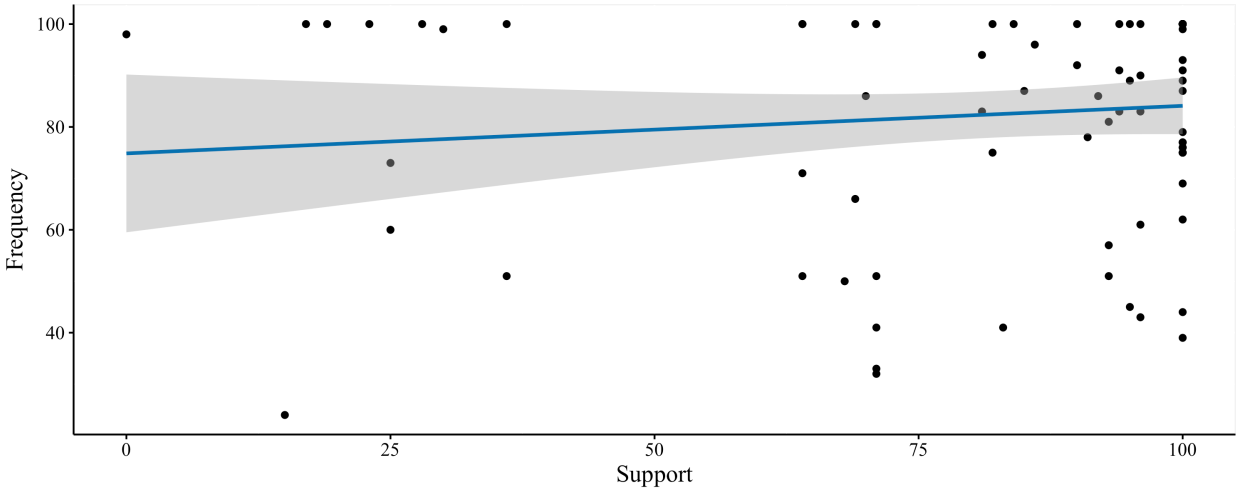

Figure 5. Self-reported frequency of technology use as a function of perceived support.

Frequency of Technology Use and Success of Technology Integration

The next relationship examined is the potential relationship between self-reported frequency of technology use with self-reported technology use success (*Figure 6*). In this case, self-reported frequency of use was found to be a statistically significant predictor of success, $b = 0.34$, $t(87) = 4.71$, $p < 0.001$. Even though the linear regression revealed a statistically significant relationship, the effect size, using Cohen's scale, was found to be small, $R^2 = 0.21$, $F(1, 85) = 22.22$, $p < 0.001$.

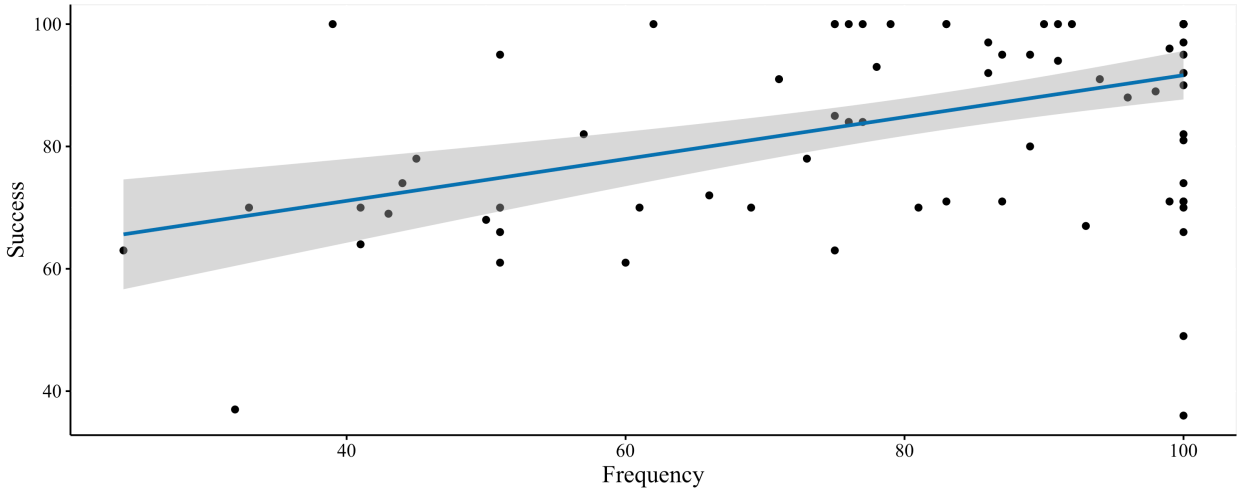

Figure 6. Self-reported success of technology use as a function of self-reported frequency of technology use.

Because the relationship is statistically significant, the means of each purpose by self-reported frequency of use and self-reported success were graphed and mean lines were added to divide the chart into four quadrants (*Figure 7*). The upper-right quadrant, for example, represents high self-reported frequency of use and high self-reported levels of success. Direct Communication and Dissemination of Materials fell into this high frequency-high success quadrant. Research and Curation and Creation of Knowledge, on the other hand, fell into the low frequency-low success quadrant. The remaining purposes fell into the low frequency-high success quadrant.

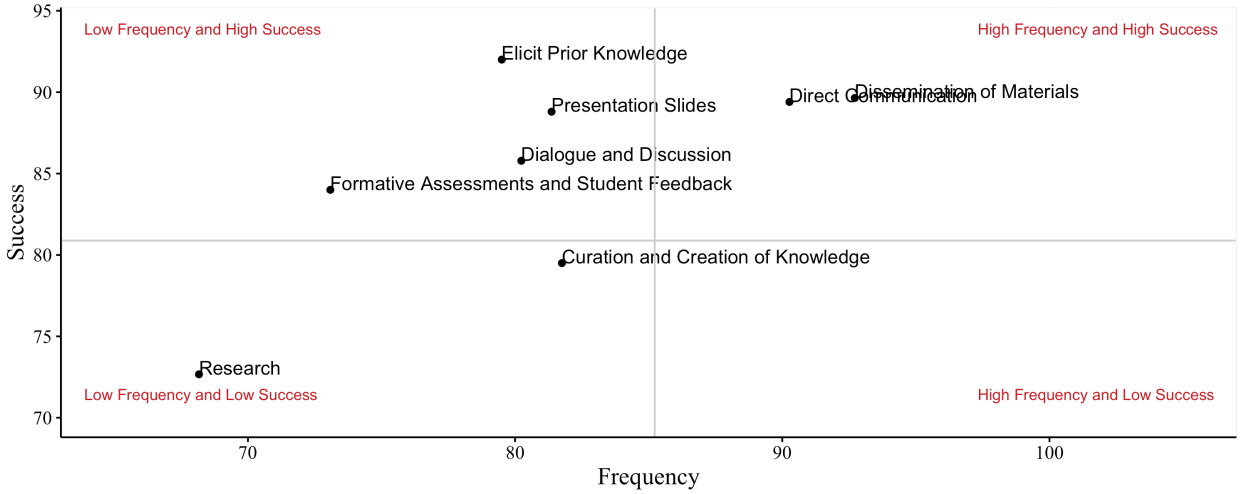

Figure 7. Self-reported frequency of use versus self-reported success divided into four quadrants by mean.

Support and Success of Technology Integration

Lastly, the potential relationship between perceived support and self-reported success of technology use by purpose was examined (*Figure 8*). Also in this case, perceived support

was found to be a statisically significant predictor of self-reported success, $b = 0.23$, $t(87) = 3.74$, $p < 0.001$. Again, even though the relationship was found to be statistically significant, the effect size was found to be small, $R^2 = 0.14$, $F(1, 85) = 14$, $p < 0.001$.

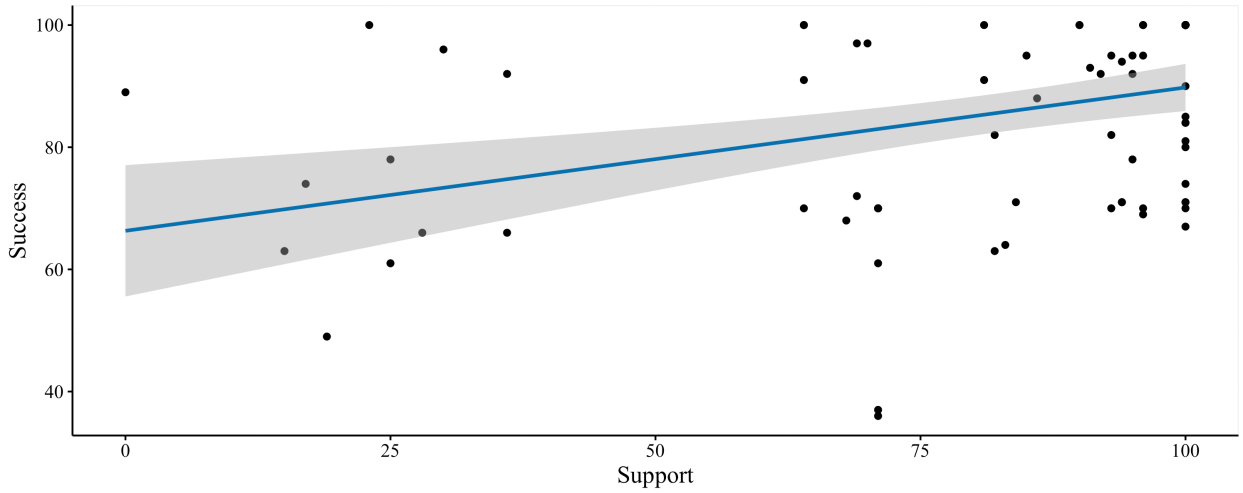

Figure 8. Self-reported success of technology use as a function of perceived support.

Due to the statistically significant–if small–relationship, the means of each purpose by self-reported frequency of use and self-reported success were graphed and mean lines were added to divide the chart into four quadrants (*Figure 9*). A plurality of purposes fell into the high support-high success quandrant, with Presentation Slides and Formative Assessments and Student Feedback falling into low support-high success. Curation and Creation of Knowledge and Research fell into low support-low success.

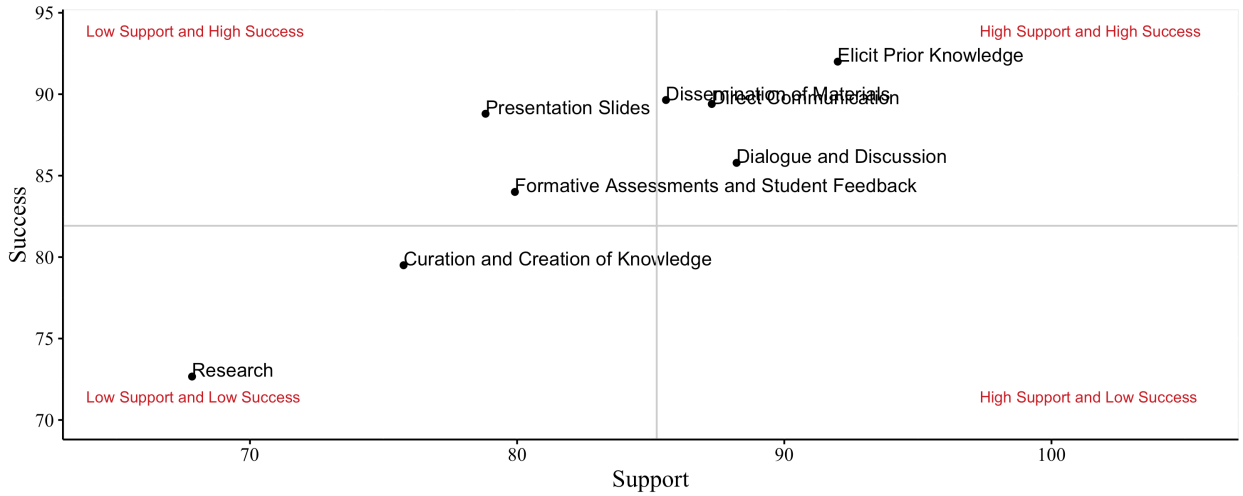

Figure 9. Perceived support versus self-reported success divided into four quadrants by mean.

What Practices Do You Draw Upon to Teach with Technology?

Beyond teaching with technology purposefully, faculty must draw upon and aspire to a range of pedagogical practices. This section of the report explores the practices that the IUPUI Teacher Education Faculty currently identify they use, and those practices that they would like to draw upon in the future. The *a priori* practices included:

- Intentionally modeling the use of technology for educational purposes (**Modeling**);
- Providing feedback and pointing out opportunities for using technology for educational purposes (**Feedback**);
- Providing time and support to practice using technology for educational purposes (**Practice**); and
- Telling your students to use or how to use technology (**Telling**).

Current Practices

Faculty were asked to identify their degree of agreement with the four practices in terms of current enactment on a four-point likert scale (Strongly Agree, Agree, Disagree, or Strongly Disagree; *Figure 10*). Between 71% and 76% of faculty indicated that they Agree or Strongly Agree that they draw upon all four practices in their teaching. The two practices receiving 71% positive are Practice and Feedback, while faculty indicated a 76% positive agreement with Modeling and Telling. The percent of faculty who indicated Strongly Disagree was the same across all practices except for Telling, which received the largest percentage of Strongly Disagree.

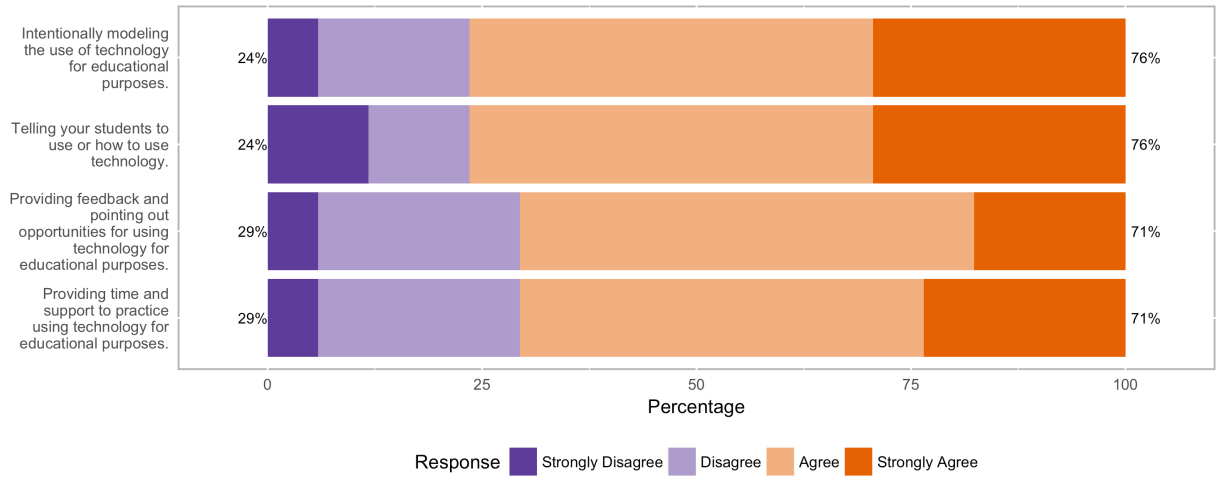

Figure 10. Agreement with existing a priori practices.

Desired Practices

Faculty were also asked to identify their degree of agreement with the four practices in terms of working towards *future enactment* on a four-point likert scale (Strongly Agree, Agree, Disagree, or Strongly Disagree; *Figure 11*). All faculty (100%) indicated that they would Agree or Strongly Agree with Modeling and Practice as practices to draw upon in the future. Most faculty (93%) indicated in the positive that they would draw upon Feedback as a practice, with a small number, 7%, indicating that they disagree. A majority of the faculty (79%) indicated that they Agree or Strongly Agree with Telling as a future practice, while about 15% indicated Strongly Disagree and the remainder, about 6%, indicated Disagree.

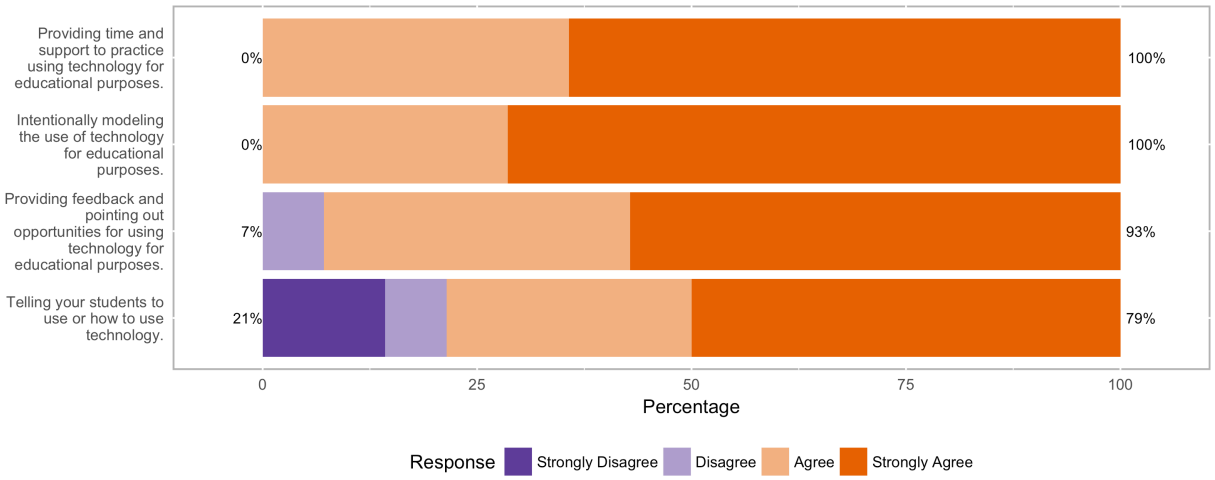

Figure 11. Agreement with desired practices.

Relating Current and Desired Practices

In order to understand the relationships between current and desired (or future) practices, a Wilcoxon Signed-Rank Test, a paired nonparametric test to compare means, was conducted on each *a priori* practice. A statistically significant finding indicates that there is a shift between the practices faculty currently draw upon and the practices they hope or intend to draw on in the future. Each practice will be addressed in turn.

Feedback

A Wilcoxon Signed-Rank Test indicated that the median desired score for Feedback (4) was statistically significantly higher than the current median score for Feedback (3), $Z = 2.95$, $p < 0.01$. The effect size ($r = 0.79$) is very large. This indicates that there is a strong desire to increase Feedback as a practice to draw upon when teaching with technology.

Figure 12. Relationships between current and desired practices around providing feedback.

Practice

A Wilcoxon Signed-Rank Test indicated that the median desired score for Practice (4) was statistically significantly higher than the current median score for Practice (3), $Z = 2.93$, $p < 0.01$. The effect size ($r = 0.78$) is very large. This indicates that there is a strong desire to increase Practice as a practice to draw upon when teaching with technology.

Figure 13. Relationships between current and desired practices around providing opportunities for practice.

Modeling

A Wilcoxon Signed-Rank Test indicated that the median desired score for Modeling (4) was statistically significantly higher than the current median score for Modeling (3), $Z = 2.79$, $p < 0.01$. The effect size ($r = 0.75$) is very large. This indicates that there is a strong desire to increase Modeling as a practice to draw upon when teaching with technology.

Figure 14. Relationships between current and desired practices around intentional modeling.

Telling

A Wilcoxon Signed-Rank Test indicated that the median desired score for Telling (4) was not statistically significantly higher than the current median score for Telling (3), $Z = 0.15$, $p < 0.98$. This indicates that there is not a desire to increase Telling as a practice to draw upon when teaching with technology.

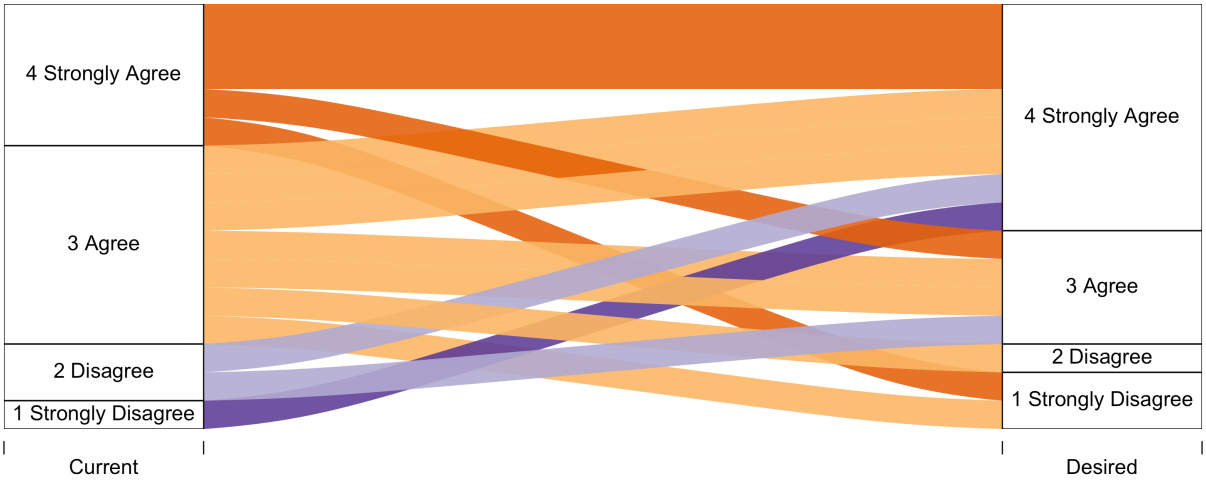

Figure 15. Relationships between current and desired practices around telling.