

## Identifying key factors in the adoption of innovative practices

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Researchers discovered better ways to accelerate and improve the adoption of innovative practices in teaching with technology using Everett Rogers' five stages to the innovation-decision process: knowledge, persuasion, decision, implementation, and confirmation. Researchers interviewed instructors and local change agents in an effort to document the adoption of innovative practices, identify techniques change agents use to facilitate the adoption process, determine which change agents are most influential to the adoption process, and discover the role of innovation reinvention in the decision making process. Internal change agents must be more proactive in creating positive experiences via information sources, pedagogical understanding, technical support, and innovative reinvention ideas. Academic support organizations can then provide improved support in the adoption process in order to achieve smoother technical and pedagogical implementation of technology in teaching and learning.

**Keywords** adoption; technology; innovations; innovative practices; teaching; learning; change agents; reinvention

### 1. Background

Within an organization, the adoption of innovative practices occurs at varying rates. Because of this, instructional products and practices may become obsolete before being implemented. The challenge is to speed up the adoption process of not only the technological product itself, but the process of developing and implementing innovative practices toward long-term educational goals.

When instructors and support staff combine pedagogy with technological innovations – defined by Rogers (2003) as a new idea or practice, all stakeholders may see a long-term benefit to the implementation of those technological innovations. These innovations may not effectively stand by themselves, but with proper integration into educational objectives at the school, program, and course level, they can successfully enhance teaching and learning.

The need to support innovations is present in a wide variety of teaching circumstances. The concept of adopting innovative practices involves supporting instructors in developing and utilizing new ways of teaching and learning. Distance learning, instructional projects, and course management systems are just a few examples of the process of adopting innovative practices. By understanding this process, academic support organizations and other education staff can determine where faculty support is needed most and can allocate resources accordingly. Improved support in the adoption process is critical in order to achieve smoother technical and pedagogical implementation of technology in teaching and learning.

One of the most important factors in the development of better instructional practices is the adoption of innovations. Rogers (2003) defines an innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (p. 12). In this context, innovation refers to not only hard technologies such as computers, software, and other electronic devices, but more importantly soft technologies such as pedagogies, problem-based learning, and teaching and learning strategies (Beckwith, 1988; Celsi & Wolfinbarger, 2002). This distinction, combined with the challenges that faculty members face in adopting innovations (Hall & Elliott, 2003; Hedberg, 2006; Henderson &

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Dancy, 2005; Vrasidas & Glass, 2005), the complexity of the adoption process itself (Rogers, 2003), and the responsibilities of support organizations in the adoption process (Bottomley, Spratt, & Rice, 1999; Clegg, Konrad, & Tan, 2000; Ehrmann, n.d.; Friedman, 2006; Johnson, 2006; Reeves, 2006), all play vital roles in the successful adoption of innovative practices.

The purpose of this research is to discover techniques for accelerating and supporting the adoption of innovative practices in teaching with technology. Researchers interviewed a cross-section of ten instructors who conducted a pilot study with the TurningPoint audience response system, interviewed two local change agents at the Center for Instructional Design (CID) on the BYU campus, and analyzed student and faculty surveys administered during the pilot study in an effort to document the adoption of innovative practices with TurningPoint, identify techniques change agents use to facilitate the adoption process, determine which change agents are most influential to the adoption process, and discover the role of innovation reinvention in the decision making process.

## 2. Findings

Based on instructor interviews, most change agents were outside of the university context. Primary change agents included associates from other institutions, vendors conducting product demonstrations at conferences, and the instructors themselves conducting personal product research.

The more pedagogical understanding instructors have, they more likely they are to endure implementation hardships in favor of long-term learning. Instructors must be proactive in product and innovation research and consultation with other associates, as well as have specific pedagogical goals. Support staff must in turn be able to not only discuss technical implementation but also particular innovative ideas for using the product in the classroom.

While the intent of the CID was to implement an unsupported product, the instructors and students needed an active customer service system in place to provide setup, training, and troubleshooting. Numerous technical difficulties stemmed from dysfunctional response devices, the lack of or improper classroom installation, and the lack of training for customer support personnel to handle troubleshooting operations.

### 2.1 How does the Center for Instructional Design (CID) facilitate the adoption process?

Although the CID exerted significant effort to provide technical and pedagogical information to instructors (via an expo event and training demonstrations), many instructors took the search for information even further. They came in contact with vendors and professional colleagues at conferences and seminars who provided more details not only about TurningPoint itself, but about audience response systems as a whole. Instructors also engaged in personal research in order to find products that met their educational goals (e.g., quizzes, student assessments, peer instruction), and focused more on the educational process as a whole rather than on adopting an individual product. For instructors the product was simply a catalyst to employ learning objectives.

The CID took a detached approach to the implementation process for the audience response systems. Although the CID served as a point of contact for pedagogical questions and a liaison with the vendor for technical issues, instructors were largely on their own with regard to the actual product implementation. There was no intended implementation guidance to the instructors.

Instructors, on the other hand, wanted and needed an active support system during the entire adoption process – especially during the implementation stage. The lack of background setup before and technical support during the process left a distinct void for the instructors. The unreliability of the response

devices, as well as other technical issues, unwittingly became a deterrent to proper use of the audience response systems. Despite the fact that many instructors suffered negative experiences with audience response systems, there were some instructors who persevered through the problems and created their own positive experiences. Instructor background research, knowledge, willingness, and possession of long-term goals were keys to success and decisions on future use.

## 2.2 What change agents internal and external to the Center for Instructional Design (CID) are most influential in the adoption process?

Although the CID sought to be an influential change agent by providing technical and pedagogical information to instructors, the CID was only one part of the equation. Instructors also conducted individual research on various audience response products, obtained information and guidance from colleagues and other professional acquaintances, and in some cases found outside funding or assistance. Outside change agents had a much more influential and significant impact on the adoption process than the CID alone. Based on instructor interviews, change agent association often determined credibility and decisions to adopt the audience response system.

The most important change agents during the implementation process undoubtedly were the CID and technical support personnel. Although they had a limited knowledge and resources with which to assist in resolving the technical issues, instructors considered them to be crucial in this stage of the adoption process.

Instructors tended to reflect on their implementation experiences, recall the initial factors and ideas that contributed to the adoption decision, and reaffirm the knowledge base that went into the decision making process, in deciding whether to continue to employ the audience response system in their educational program. The quality of the events that transpired, including the educational value of the audience response system, ultimately compelled the positive or negative confirmation.

## 2.3 What role does the reinvention ability by the faculty play in the adoption process?

Researchers found no evidence to suggest that reinvention ability played a role in the knowledge, persuasion, or decision stages of the adoption process. Reinvention could be integrated into these stages, however, when change agents take the initiative to promote new ways to use the audience response system. Researchers found that once instructors worked with the product, they realized the potential for other implementation techniques than previously determined. Positive reinvention abilities were a significant factor in determining whether the instructor continued to utilize the audience response system. Even though there were other setbacks to the adoption process (i.e., technical difficulties), instructors decided to continue using the product because of the positive experiences they encountered.

## 3. Recommendations

One key factor not addressed as thoroughly as necessary was instructor support for the product. While the instructors themselves could be considered the innovators of audience response systems (having first researched and utilized audience response systems independently), their research experiences are strictly independent of the whole program. Adequate identification of the educational needs and goals of faculty campus-wide and inclusion of those needs and goals in the product research may have generated different results.

According to CID interviews, the CID conducted initial product research prior to the pilot study *independent* of other faculty or staff. Product decisions, as well as initial ideas for implementation, need to be developed as a university-wide collective body. Academic support organizations need to become stronger facilitators between the instructor and information sources such as vendors, employers, and other education professionals. As instructors become more knowledgeable about technologies and pedagogies, they can make more informed implementation decisions and can become an energetic source of ideas for developing and improving innovative practices.

Instructors need to recognize the firm connection between technology and pedagogy and be able to implement pedagogy in the classroom.

Change agents internal and external to the organization must do everything in their power to be a vital link between the user and the innovative practice. While different change agents have varying degrees of authority based on their position in the organizational hierarchy, they can be powerful within their circle of influence. According to instructor interviews, the majority of the change agents were outside of the university. The CID and other support staff must seize the opportunity to *create* change agents within the university, who can in turn relate positive experiences and share new ideas with other faculty in order to develop and reinforce persuasion in favor of an innovative practice.

Support staff must ensure instructor endorsement of the product from the onset of research, testing, and implementation. Including faculty in the assessment and determination to use a given technology encourages support for that technology.

Acceleration in the adoption of innovative practices emerges through a combination of the elimination or minimization of barriers to implementation, and the constant flow of information and support for the innovation. When instructors observe (via data and human interaction) the degree of importance of this innovation in the overall learning process through active commitment of resources and organizational vision, the instructors in turn develop a better sense of confidence not only about the product itself (through adequate customer service), but more importantly about the process of instructional realization.

In addition to information and understanding, instructors also need a solid commitment of technical support from academic support organizations and other staff. Support staff must ensure instructors have the long-term technical support system they need to troubleshoot and fully employ the innovation, to include vendors, technical staff, and liaisons. Regardless of the amount of training instructors receive, if they do not have technical support and customer service resources immediately available, then their confidence about the product *and the process* begins to wane. Instructors do not need temporary scaffolding to help them through the initial training and startup; they need reliable technical expertise to provide immediate solutions while in the classroom.

Information systems technicians at the university did not install TurningPoint in all of the necessary tech rooms, requiring instead that instructors use TurningPoint on their own laptops and shuttle the laptop to and from class as necessary. This added to the problem of response system inaccuracy via the lack of recognition and synchronization of the respective audience response systems and devices. Information systems technicians did not offer much technical assistance, but they did the best they could considering the circumstances. The exact reason for the lack of technical support was unclear (e.g., employee training, product licensing, contract issues, need underestimation, vendor support).

Based on interviews with the CID members, the adoption process could be accelerated as barriers such as the reluctance to try new innovations and hardware limitations or technical difficulties are removed. The CID is seeking to build innovation evangelists through training and creating positive experiences. Thorough training and testing of the product and the process can result in great strides toward success.

## 4. Conclusion

The adoption process will accelerate as all stakeholders are involved and can see the long-term benefit of the innovation as one part of the instructional picture. Users must be persuaded both technically and pedagogically. Support staff must ensure that users have positive experiences in order to create change agents to further allow the adoption to proliferate.

The adoption process will improve as all stakeholders focus on pedagogy in the classroom. Reinvention must be part of the process from the onset of the adoption. Early in the adoption, support staff may be the only change agents. Therefore, they have the responsibility of not only describing what a product does, but what it can do and how that product fits into the curriculum.

By supporting faculty members in adopting innovative practices, support staff can create integrated technological and pedagogical learning environments. These environments are by definition long-term and self-sustaining. Faculty and support staff need to think of the adoption of innovative practices as a long-term educational outcome process. Faculty and staff must continuously formulate and assess educational goals and the means to achieve those goals. Such means may include the adoption of a variety of innovations over the course of the educational outcome process. Faculty and staff must develop a vision of the educational pathway and view technology as an integral part in achieving the vision.

When support staff provide the scaffolding for faculty implementation of technology in the form of technological and pedagogical training, they allow the faculty members to creatively implement an educational environment conducive to long-term teaching and learning. Technological innovations in the long run will not disappear. While each innovation has its time and season for use and benefit, maximum effort must be exerted in order to make that season a success and to build positive experiences for future innovations.

Change agents must play a more active role in the knowledge, persuasion, decision, implementation, and confirmation phases of the adoption process. Advance preparation for the adoption is essential to success. Change agents should seek to provide exceptional product information, pedagogical understanding, and technical support in driving the adoption of innovative practices forward. Academic support organizations such as the CID need to provide instructors with the information about, the pedagogical understanding intended for, and the technical support for the innovation.

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