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Using Instructional Technology in Teacher Preparation: A Comparison of Global Teacher Preparation

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Abstract

This project seeks to answer the research question, how do countries ranked in the top-20 using a global composite score use instructional technology in the preparation of future teachers? The global sites selected for this study are reflective a highly performing system (Japan >5.0 on the composite scale), an above-average performing system (United Kingdom between 5.0 and 10.0 on the composite scale), an average performing system (Canada between 10 and 12 on the composite scale), and a below-average performing system (USA between 12 and 15 on the composite scale). In each country a teacher preparation conference was identified as the data collection site for this project. During this project the researcher interviewed teacher preparation faculty using the Concerns Based Adoption Model (CBAM) Levels of Use (LoU) Interview process (Hoard, Rutherford & Hall, 2006 & 2007) about traits and practices that lead to the country being rated in the global top-20 composite scores.

INTRODUCTION

Teacher preparation is a dynamic enterprise where innovations and outside influences play an ever-increasing role. One innovation, in particular, has become a "game changer" for university faculty and future teachers with respect to classroom instruction. That innovation is instructional technology in the classroom. This project seeks to answer the research question, "how do countries ranked in the top-20using a global composite score use instructional technology in the preparation of future teachers?"

SELECTION OF COUNTRIES

During the past twenty years the use of instructional technology has become an expected and essential aspect of classroom life in many countries around the world. This project explores the use of instructional technology in teacher preparation institutions in countries where the educational systems meet specific ranked criteria. These criteria include:

1. The country is ranked in the top-20 in the world for student performance (Gayathri, 2011)
2. The country is ranked in top-20 in the world for teacher pay (Rampell, 2009).
3. The country has an overall rating of teacher preparation that is ranked in the top-20 in the World. (Henion, Geary, Tattoo & Schwile 2012).

As shown in Table 1, the selected countries for this study meet the specified criteria and provide a range of composite scores where the rankings are indicative countries with high teacher pay, effective teacher preparation programs, and effective student performance on comparative tests. Although there are some countries with higher ranked student performance, for example South Korea and Finland, these countries only meet some of the criteria of the composite score as to the countries identified in Table 1.

In addition, the sites selected represent a range of sites (Table 1) reflective of highly performing systems (Japan > 5.0 on the composite scale), above-average performing systems (United Kingdom between 5.0 and 10.0 on the composite scale), average performing systems (Canada between 10 and 12 on the composite scale), and below-average performing systems (USA between 12 and 15 on the composite scale).

Table1: Comparisons of International Rankings of School System, Rank of Teacher Pay, International Rating of Teacher Preparation, and calculated Composite Score.

Country Composite Ranking	A	B	C	D
Japan Highly performing	2	4	2	8/3= 2.7
United Kingdom* Above-average performing	11	9	6	26/3= 8.7
Canada Average performing	5	15	13	33/3= 11
USA *Below-average performing*	17	20	7	44/3= 14.7

A= International Ranking of Educational System
B= Rank of Teacher Pay
C= International Rating of Teacher Preparation Programs
D= Composite Score of Educational System / Teacher Preparation System Rating
(A +B+C)/3

Context of the study

Changing college-level instruction in teacher preparation through instructional technology

Most researchers agree that the more familiar an individual is with a given tool, the more likely they are to use it. In the classroom, this seems to hold true for instructional technology and the preparation of educators. In one recent study results indicated that in the areas of planning, email, teacher-directed student use, recording grades, delivery of instruction, and providing accommodations in the classroom future classroom teacher were more comfortable with instructional technology when demonstrated and modeled by college faculty (Russell, et al, 2013). In addition, future teacher used instructional technology in their teaching methods courses, they were far more likely to use these tools when they entered the classroom (Tondor, et al, 2012). In addition, the more future teachers used instructional technology as a part of their learning experience, the more likely they were to use instructional technology in their teaching internship experience and eventually in their own classroom (Bell, Maeng & Binns, 2013). This trend continues throughout the learning experience with results indicating that when used in the content preparation of future teachers, those future teachers are more likely to use instructional technology in their classroom to teach content. They are also more likely to use instructional technology throughout their curriculum (Tondeur, et al, 2012).

Importance of instructional technology in using teacher preparation

Another important factor that is in play in determining the level of use of instructional technology by novice teachers is the perceived value of instructional technology of the teaching methods faculty. In one study researchers determined that the higher the value teaching methods faculty placed on the use of instructional technology, the more likely novice teachers were to use instructional technology in their own classrooms as both interns and as the classroom teacher (Miranda & Mitchell, 2013). While in other studies the researchers determined the relationship between the perceived importance of the use of instructional technology increased as an inverse to teacher seniority (Karacan, Yam & Yildirim, 2013). In addition, other authors have identified the link between instructional technology and instructional effectiveness (Guyer & Sahin, 2011) as being of extreme importance in being able to deliver effective instruction to students in our information based world.

Comfort level of college-level faculty in using instructional technology in instruction

Although an important of life in higher education, many college faculty have a lack of confidence in the use of instructional technology for college teaching. Their perception is that

there is a lack of alignment between the instructional technology to be used and the classroom assignments being completed (Bennett, et al, 2012). In addition, some faculty advocate the use of instructional technology, for the sake of using instructional technology and not for the benefit of student learning in the classroom (Njenga & Fourie, 2012). While other researchers advocate a "for teaching" vs "for learning" comparison in exploring the use of instructional technology in classroom teaching (Ottenbreit-Leftwich, et al, 2012). Overall, instructional technology use in higher education continues to rise, and the comfort level of college faculty in their own use of instructional technology has a big impact in the preparation of future educators, and in the eventual teaching and learning in preK-12 classrooms (Renes & Strange, 2011).

Methods

During this project the researcher interviewed teacher education faculty attending identified professional development events held in the USA, Canada, the United Kingdom, and Japan and conducted "man on the street" style interview with 15 individuals representative of the host country. The 60 interviews were completed through the use of the Concerns Based Adoption Model (CBAM) Levels of Use (LoU) Interview process, commonly referred to as the LoU. Overall, the 60 LoU interviews provided a representative overview of the implementation of instructional technology in teacher preparation programs in the identified countries. The LoU process is an internationally known, valid, and reliable instrument, and the researcher is certified in the Concerns Based Adoption Model (CBAM) Levels of Use (LoU) Interview processes through the Southwest Regional Educational Laboratory (SWREL). At each data collection event the researcher interviewed 15 teacher preparation faculty about their use of instructional technology in the teacher preparation process at their respective institutions. Once collected the data was analyzed according to the CBAM/LoU Interview protocol (Orr & Mrazek, 2013), and the results analyzed and classified according to the categories of implementation in the CBAM/LoU Interview.

The LoU Branching Interview consists of a series of questions and prompts intended to help the researcher identify information about the implementation of a specific innovation, as well as explain both supports and barriers to the implementation within each country in the area of instructional technology. The responses were coded and analyzed to match with the eight LoU categories. These categories for the LoU include:

> Level 1 - Non-use: no interest shown in the innovation. No action taken.
> Level 2 - Orientation: Begin gathering information about the innovation
>
> Level 4 - Mechanical Use: Plans ways to implement the innovation.
>
> Level 5 –Routine: Comfortable with innovations. Implements appropriately.
>
> Level 6 –Refinement: Plans ways to improve the innovation.
>
> Level 7 –Integration: Integrates innovation with other initiatives. Does not view as an add-on; collaborates with others.
>
> Level 8 –Renewal: Explores new and different ways to use the innovation.

Responses for the series of interview questions and prompts were coded and analyzed through descriptive statistical means as many of the responses were zero and clusters of information were located in two specific areas.

Results

The LoU interviews provided a great deal of information related to the use of instructional technology in the preparation of teachers in the USA, Canada, Japan, and the United Kingdom.

In Table 2 the results from each country are presented for comparison.

As all respondents were "methods faculty" from teacher preparation programs there are several items of note from the available data. Across all countries there are similar reports of instructional use for email, presentation software, using mobile devices for instruction, collaborative document editing, online assessment, content management system, and using the Internet as a part of instruction. These similarities point to a general perception that technology is a tool and that the use of technology types is similar across faculty from the identified countries.

In addition, as presented in Table 2, some countries provided an aberrant result. For example, while most faculty from the USA, Japan, and the United Kingdom reported a high frequency of the use of shared documents (range 73-87%) those faculty in Canada reported a significantly lower usage of this technology tool. These data appear in contrast to the data reported for Collaborative Editing of documents (range 27 – 27) for all four identified countries. Thus it appears that methods faculty are working with and sharing files and documents. However, they are not working in a collaborative online environment to edit or present these documents. Only Canada with the reported low use of files shared (47%) was somewhat consistent with the reported usage for Collaborative Editing (27%).

After processing the interview responses the researcher was provided with an overview of the use of instructional technology in the four identified countries with respect to faculty perceptions of their own professional use, and are available in Table 3. In all four countries no faculty (0/60)

Table 2: Instructional Technology Strategies Frequently Used Within Teacher Preparation Programs

Type	USA N=15	Canada N=15	Japan N=15	United Kingdom N=15	Overall N=60
Email (variety of sources)	100% (15)	100% (15)	100% (15)	100% (15)	100% (60)
Presentation Sofware (ex – Powerpoint, Prezi, Keynote)	100% (15)	100% (15)	100% (15)	100% (15)	100% (60)
Online media (youtube, online video)	100% (15)	80% (12)	80% (12)	100% (15)	90% (54)
Online Assessment	27% (4)	13% (2)	13% (2)	13% (2)	17% (10)
Content Management System (ex – Blackboard, Angel, Banner)	73% (11)	87% (12)	73% (11)	87% (12)	77% (46)
Shared files (ex - Dropbox, Google Docs) for administration/planning	87% (12)	47% (8)	73% (11)	73% (11)	70% (42)
Shared files (ex - Dropbox, Google Docs) for instruction	100% (15)	87% (12)	87% (12)	73% (11)	83% (50)
Collaborative editing (ex – Google docs)	27% (4)	27% (4)	27% (4)	27% (4)	27% (16)
Internet as a part of instruction	100% (15)	100% (15)	100% (15)	100% (15)	100% (60)
Using mobile devices for instruction	33% (5)	27% (4)	33% (5)	27% (4)	30% (18)

were identified as being at the Non-use, Refinement, Integration, or Renewal Levels. Only 39% of faculty across the four countries were identified as being at either the Orientation or Preparation Levels. And while 25% of all faculty were identified as being at the Routine Use Level, a total of 57% of faculty were identified as being at the Mechanical Use Level.

There were variations between countries based upon the identified level. For example, Japan provided the highest number of faculty at the Preparation Level. A result that was a full 5 times larger than any of the other countries. While no faculty from Canada (0%) were identified as being at the Orientation Level, overall 27% of the total faculty were identified as being at the Orientation Level. The highest percentage of faculty identified in the Orientation and Mechanical Use Levels were from the United Kingdom, and the highest percentage of faculty at the Preparation Level were from Japan. The USA had the highest number of faculty identified in the Routine Use Level, and was ranked as 3rd in the Mechanical Use Level.

Table 3. Participants per country rated by identified Level of Use

Countries è Categoriesê	USA (N=15)	Canada (N=15)	Japan (N=15)	United Kingdom (N=15)	Overall (N=60)
Level 1 Non-Use	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Level 2 Orientation	1 (6%)	0 (0%)	1 (6%)	2 (12%)	4 (27%)
Level 3 Preparation	1 (6%)	1 (6%)	5 (33%)	0 (0%)	7 (12%)
Level 4 Mechanical	8 (53%)	10 (67%)	5 (33%)	11 (73%)	34 (57%)
Level 5 Routine	5 (33%)	4 (27%)	4 (27%)	2 (13%)	15 (25%)
Level 6 Refinement	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Level 7 Integration	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Level 8 Renewal	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 4: Countries ranked by number of faculty for the identified Levels of Use

Countries è Levels of Use Categoriesê	USA	Canada	Japan	United Kingdom
Level 1 Non-Use	-	-	-	-
Level 2 Orientation	t-2	4	t-2	1
Level 3 Preparation	t-2	t-2	1	4
Level 4 Mechanical	3	2	4	1
Level 5 Routine	1	t-2	t-2	4
Level 6 Refinement	-	-	-	-
Level 7 Integration	-	-	-	-
Level 8 Renewal	-	-	-	-

Ignoring the zero values for the process, each of the countries can be rated in a first through fourth scheme for Orientation, Preparation, Mechanical, and Routine Use Levels and are presented in Table 4. Using this system, each country is rated first in at least 1 area, and each country is rated last in at least one area. Although there are many ties in ranking, only the United Kingdom is ranked first for two categories and ranked last for two categories.

CONCLUSIONS

The available data tends to connect with four specific conclusions related to the use of Instructional Technology by higher education faculty in teacher preparation programs.

First, overall the use of instructional technology by faculty participating in the teaching methods portion of teacher education programs appeared consistent. Almost all faculty reported a consistent use of many forms of instructional technology in the higher education classroom. Faculty demonstrated a ongoing Mechanical Use or Routine Use in many areas of instruction. In addition, there appeared to be very little reporting by faculty that reflected either a minimal use or innovative use stance of instructional technology.

Second, faculty who participated in this study appear to demonstrate a level of comfort related to Instructional Technology that is relatively consistent across the four countries explored. Although there were variations in the reported use of Instructional Technology and the reported Level-of-Use rating within each country. Across all countries the ratings were relatively consistent with Levels 3, 4, and 5 being the most prevalent, and reflecting the highest levels of comfort for the levels of Preparation, Mechanical-Use, and Routine-Use.

Third, when using the identified composite scale where the four countries were ranked, the use of instructional technology does not appear to be a factor to promote or inhibit student performance. Reported results were similar for Japan (High performing) and the USA (Low performing), as were those for the United Kingdom (Above-average performing) and Canada (Average performing). This non-impact factor is best shown through Table 4 where all countries are represented through data where each country is rated first in at least category and fits in the mean and median areas for most other categories. In short, the use or non-use of Instructional Technology by teacher preparation methods faculty does not seem to relate well to the overall global ranking of the four countries through the composite rankings used in this project.

Lastly, additional study in this area is needed. If in fact the use of Instructional Technology by faculty in teacher preparation programs is not a defining factor in the overall performance of the four identified countries, what are the keys that promote student performance? Also,

what are the factors that separate highly performing countries from above-average, average, and below-average performing countries on a global composite scale?

In summary, although it seems that the use of Instructional Technology by faculty in teacher preparation programs is not an effective factor for exploring the global performance of Japan, United Kingdom, Canada, and the USA, it is an interesting feature that there is so much similarity between the teacher preparation programs use of Instructional Technology and the faculty comfort with Instructional Technology across all four countries.

Special Thanks

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