Perceptions of Research

Dr Rob Phillips
Manager, Open, Distance and e-Learning
Murdoch University
Perth, Western Australia

Part 3

Activity

Try to apply these lenses to the types of research you have done. It would be useful to get the responses of those who have worked in other disciplines. However, I would also like you to consider your educational technology work. Which types of research are appropriate to the aspects of educational technology you work with? Please try to keep your responses to ~1 page. Once again, there is a 24 hour deadline.

Synthesis

Bruce Jones wrote:
"In your Pasteur's Quadrant you leave the NO/NO quadrant blank and indicate that this is where Educational Technology/Educational Design (ET/D) are located. Yet, this is where 'in my opinion' the research that counts is being done. This is the ET/D in the trenches, where innovation is many times out of desperation not research. IF it works it is repeated and refined and possibly shared through a simple write up for a symposium or conference. Once it becomes accepted as a way or method and adopted then someone may become curious as to the whys and hows and do the formal research."

I can see a logical inconsistency in your statement which is worth unpacking. I agree that the exploration and innovation you mention is a component of the creativity associated with research, though I am assuming that you refer to the development of a product. Then you state "if it works…". This immediately takes us into the right hand column of the quadrant, with a 'consideration of use'. How else can we find if the product works other than by using it? I believe Tom Reeves' issue with the NO/NO quadrant was in the methods use and evidence presented about how the product works.

Bruce Jones also wrote *"Research without application is useless and cost me a job once"*. While I can see where you're coming from ☺, this statement devalues the work in theoretical chemistry and physics done by Jan Visser and myself. It may be that the primitive computational work I did thirty years ago contributed in a small way to molecular modeling of new drugs today, but that is a very long bow to draw. Still if people like Jan and I hadn't done this work, it is unlikely that current computational techniques would have developed.

Thank you for helping me make this point. **There are many kinds of research, depending on the lens you look through.**

Jan Visser had a problem with the use of classification schemes:
"I'm not sure how useful the classification schemes of types of research and scholarship are. For me they come in after the fact. Looking back at what one did one may put it in a particular box, but before one does it, it begs the question 'Why should I care?'".

The reason I presented these schemes was for people to recognize that there *are* different boxes. Too often I read work using methodologies appropriate to the scholarship of discovery, or pure – basic, research, but where the work is really use-inspired basic research, for example.

It is important that you identify for yourself the type of research you are attempting, before you start. Different types of research might require different methodologies – but maybe you are using the wrong methodology because you haven't thought about the type of research you are doing.

As one example, and without personally criticising a guy whom I new well when he was in Australia in the 1990s, Clark Quinn used these terms in his initial response about the nature of research: *"to develop and test hypotheses"* and *"the ability to organize activity in a way to explore and test reliably and repeatably"*. These are methodological issues which are certainly appropriate in some types of research. For example, hypotheses are not appropriate for something which has not been discovered yet, like the wave/particle duality of radiation. Theories might be appropriate, but not hypotheses. Similarly, repeatability is probably not appropriate for anthropologists studying the many tribes in New Guinea.

Research Aims and Outcomes

My colleague David Tripp (http://www.education.murdoch.edu.au/staff/david_tripp.html), who is well known in action research and qualitative evaluation circles, advises that the principal outcome sought from any research determines the main research activity, and the type of research questions to be asked.

I find that lack of clarity in research questions is a weakness in almost all papers I review. The table below may assist you in clarifying your research outcomes. Of course this needs to be in the context of an appropriate type of research, as discussed above.

Outcome	**Activity**	**Type of question**
Description	Observation	What … ?
Explanation	Pattern development	How does .. ?
Prediction	System recognition	When/where will … ?
Proof	Argument	Is it true that … ?
Evaluation	Judgment	How effective is … ?
Improvement	Change	How can we … ?
Discovery	Experimentation	Does … ?

Methods of Research

Shulman's (1988) contention that *"Method is the attribute which distinguishes research activity from mere observation and speculation"* has already been mentioned during this discussion.

Jan Visser has kindly written part of my paper for me:
"Another observation I should like to make is the following one. If we can agree that research is ***disciplined*** *inquiry and that, as Shulman states, this means that* ***method*** *is the essential attribute to make the inquiry disciplined, then I'd like to raise concern with how, in the social sciences, the preoccupation with method is often reduced to selection from a limited menu of available options: the choice between qualitative and quantitative and, within each of these areas, the selection of a particular safe and tried approach to gathering evidence and analyzing it. The availability of software packages to perform different statistical analyses encourages the behavior. It frequently leads to the inappropriate application of a particular method and thus to conclusions that lack validity. There is often little creativity among social scientists in developing a method from first principles. The increased bureaucratization of the research enterprise and the abuse of research for purposes of career advancement are probably also responsible for such degeneration and suppression of creativity. They encourage attitudes based on the idea that research is something you must do for a purpose that is unrelated to the research interest as such, so you better make sure that you get it out of the way without too much hassle."*

Reeves had similar concerns (T. C. Reeves, 1997; T. C. Reeves & Hedberg, 2002: 35) when arguing for mixed method approaches to educational technology research:
"Adherents to the "Eclectic-Mixed Methods-Pragmatic Paradigm" rarely concern themselves with ultimate conceptions of reality, preferring to deal with the practical problems that confront them as educators and trainers. They view modes of inquiry as tools to better understanding and more effective problem-solving, and they do not value one tool over another any more than a carpenter would value a hammer over a saw. They recognize that a tool is only meaningful within the context in which it is to be used."

I can also point to examples of inappropriate research methods. Several years ago I was involved in a research project looking at how senior managers at radio stations in three countries could gain a postgraduate qualification about media planning through online study. The online learning activities and delivery methods had not been developed; and there were cross-cultural issues and adult learning issues. In all it was a complicated research problem. However, a senior colleague blithely stated that she had a survey which could be used, and that basically circumvented any work we could do on a research design.

A second example arose from an internal seminar organized by David Tripp about action research. A completing PhD student gave a talk about his 'action research' into how pre-primary students could engage with interactive television. He chose action research because that was the methodology his supervisors knew about. What he was doing was developing interactive television programs and formatively evaluating their usability. The research was very similar to much educational technology research, but wasn't at all aware of this literature. He was trying to shoehorn his research into a methodology which looked at changes in his individual practice, and it just wasn't appropriate.

I am sure that others of you can report similar examples. Please share them with us. Has anyone identified through this discussion that their doctoral research may be using inappropriate research approaches or methods? I hope not.

Research into Educational Technology

Now, let's see how all this preamble can be applied to Educational Technology Research. I will some of the research work I have done into educational technology in terms of the lenses discussed in Part 2.

I have managed many teams developing innovative educational technology applications. This has involved the scholarship of discovery (see comments to Bruce Jones above), for example in the use of QuickTime VR to display large X-rays to students (R.A. Phillips, 2002; R. A. Phillips, Lafitte, & Richardson, 2001; R. A. Phillips, Pospisil, & Richardson, 2001), where a new technique was 'invented'. However, this work was also a scholarship of integration because it built on previous understandings of educational technology and pedagogy. However, this research had no component of quest of fundamental understanding.

However, once an educational technology application has been developed to function as designed, it is appropriate to investigate how it works when applied in practice: the scholarship of application. Much of my work in recent years has been of this type, studying the effectiveness of educational technology products. This involves a mixture of evaluation (making judgments and decisions about the product) and explanation (trying to understand how people use the product in order to learn).

An important insight I gained recently was that educational technology research, because of its multidisciplinary nature, involves elements of many research approaches with multiple outcomes. Because of this complexity, it is inappropriate to use a single method except in particularly well-defined circumstances.

In recent years, Tom Reeves and others have been strong proponents of the concept of Development Research (T.C. Reeves, 2000). The focus of Mike Keppell's ascilite article was almost entirely about Development Research.

I won't go into this in great detail except to note that Development Research is akin to the Design Research concept which is emerging in engineering and in computer science. It is a step in the right direction. However, I will claim that the concept of Development Research may be too narrow to encompass all of the complexity of educational technology research.

Summation

"We must first understand our problem, and decide what questions we are asking, then select the mode of disciplined inquiry most appropriate to those questions" Shulman 1988

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