Dissemination of innovations: A case study

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This paper examines three questions related to the dissemination of innovations in higher education, drawing on a review of the literature on the nature of innovations and on a case study of an innovative online project that has been widely disseminated. The first question seeks to review the question of what constitutes an innovation in teaching and learning in higher education. The second and third questions seek to understand the process of dissemination of such innovations in teaching and learning, and to shed some light on what developers of innovations might do to maximize the take up of innovations.

The project in the case study has been clearly demonstrated to have been widely disseminated beyond both the origin of the project and in new marketplaces. The project was publicised using a multi-faceted distribution mechanism involving presentations at institutions and conferences, publishing of articles, and production of templates which facilitate adoption of the project. The project also facilitated participation by others, enabling them to see first hand the potential benefits of engaging with it. The outcome of these activities has been a wider adoption or scaling up of the project than is usual. This appears to have been the result of academics' perception of the value to students of their participation in such a learning activity, the ease of adaption of the project to different contexts, and the enthusiasm of adopters for promoting high quality learning experiences.

Keywords: dissemination, innovation, higher education, role-play, simulation

Introduction

As its predecessor granting bodies have done before it, The Carrick Institute for Learning and Teaching in Higher Education is funding projects which support "innovation in learning and teaching". As was also the case for its predecessor bodies, applicants are required to put forward a strategy for facilitating the dissemination and uptake of the proposed project/s. The precise definition of what constitutes an innovation has always been problematic however, and this paper discusses a range of ways of understanding this term.

In this paper a literature review around the notion of innovation is augmented by a case study of one innovation in teaching and learning that has been sustained for more than ten years. The paper discusses the particular kind of innovation involved, the process by which it has been disseminated, and finally a description of what developers of other similar projects might learn from this project.

Thus this paper seeks to address the following questions:

1 What constitutes an innovation in teaching and learning in higher education?
2 What is the process by which such innovations in teaching and learning are disseminated or 'scaled up'?
3 What might developers of innovations in teaching and learning pay attention to in order to maximize the take up of innovations?

The paper begins with a review of the notion of innovation with particular attention to what is being developed, by whom, and for what purposes. Next, two aspects of dissemination are analysed. The first is the notion of dissemination as a distribution *activity* – "a series of conscious actions, planned by persons and organizations and intended to make something known or to be sent to other persons or organizations" (Stokking, 1996, p.269). The second aspect of dissemination is referred to as an *outcome*, and this concept will be further elaborated below.

What constitutes an innovation in teaching and learning in higher education?

Almost every book on innovation includes reference to the origin of the word 'innovation' as having roots from the Latin word 'novus' meaning 'new' and "is derived into the verb 'in+novare' that covers the meaning 'to make something new'"(Tidd, Bessant & Pavitt, 1997).

If "what" an innovation is, relates to something new, then the question of "why" innovate is also important. The view that innovation is critical to the growth and sustainability of business, government, education and industry is pervasive across discipline areas as diverse as Management, Education, Design and Economics. Innovation is perceived to be necessary for survival, and hence the means by which organisations are renewed, achieve growth, and remain competitive. Those who fail to engage in innovation are doomed to failure write Tidd et al. (1997, p.12) who say that "unless organizations are prepared to renew their products and processes on a continuing basis their survival chances are seriously threatened". Others, although writing in a similar vein, note the benefits of engaging in innovation. Coyne (1999) for example, writes that "successful innovation brings us joy and confidence and well-being. It generates long-term, sustainable growth" and Janszen (2000) writes that "innovation is the golden route to building and growing a prosperous company".

Although the authors cited above were primarily concerned with business and industry, the higher education context is not too different. The changing circumstances in which higher education operates sees government: facilitating the entry of new providers of higher education to Australia; seeking further differentiation of the higher education sector; and expressing concern at the international ranking of most Australian higher education institutions. The accountability requirements for all activities have been increased at the same time as the level of funding provided for these activities is decreased. With expectations of higher levels of research output and improved student learning outcomes, set against decreased input in terms of funding, it is clear that higher education must find new ways to go about its business, in teaching, in research and in community service. In terms of the former, the holy grail of teaching innovation has been to increase the quality of learning, the productivity of learning, while at the same time increasing access to learning. The next section discusses the range of innovations that might be developed in order to achieve these outcomes.

What innovations are being developed?

Examination of the question posed by this section of the review of 'what constitutes an innovation' necessitates some discussion of the variation that exists between categories of innovations that, once developed, are distributed within the community, and which then may, or may not, be adopted. As is the case for much of the content contained within this review, the literature on this issue is vast. For the purposes of this review however, only the most commonly cited distinctions are discussed, beginning with the notion of 'innovations' as constituting something new, as processes or products, and which result in incremental or radical change. The section also includes some discussion on the different contexts in which an innovation might be 'new'.

Innovation as constituting something new

As noted above, a common view of the concept of innovation is that of something "new". In business, this view is exemplified in Janszen's (2000) definition of innovation as "the commercialization of something new, which may be:

- a new technology
- a new application in the form of a new product, service or process
- a new market or market segment
- a new organizational form or a new management approach" (p.8).

Many authors, however, acknowledge the fact that few ideas are truly "new", rather they may be new to the context (Tornatzky & Fleischer, 1990) or may be seen as a way of regenerating practice (Dempster & Deepwell, 2002).

To whom or what is the innovation "new"?

One group of definitions focuses on the degree to which the idea or innovation is new to the individual involved. For example Potgieter (2004), refers to innovation as "an idea, practice, object or combination of these that is perceived as new by staff" (p.271). Similarly, Tornatzky & Fleischer (1990) write that "we will generally consider innovation to be a change of scope that is significant at least to the person or organisation doing the innovating".

Another group of authors refer to a range of groupings of people to whom the innovation is new. The most widely cited is the work of Olson et al. (1995) who, (citing the original work of Booz, Alen & Hamilton, 1982), define four groups to which an innovation is new:

1 new-to-the-world
2 new to the marketplace but not to the origin
3 me-too products (new to the organisation but not to the marketplace)
4 product modifications.

Herein lies one of the challenges for granting bodies such as The Carrick Institute for Learning and Teaching in Higher Education which seek to provide funding for innovations in teaching and learning – to whom should the innovation be new? On the one hand there are many who would perceive an innovation to be something new to the world or to the market place (in this case higher education) and would thus provide funding for only such projects/innovations. The success rate of these projects however, might not be as high as many would believe. Firstly, the project must come to fruition and result in implementation. This is not always the case as noted in the Alexander & McKenzie (1998) report on the outcomes of 104 innovative projects involving Information and Communications Technologies (ICT) that were funded during 1993 and 1994. Despite the grant funding being specifically for projects of one year's duration, fewer than half of the cases reported their project as being at the implementation phase (p.31) in responses to the questionnaire in 1996, and the various difficulties encountered by developers of the innovations are well documented in the report. As well as the difficulty of achieving a project outcome, a second difficulty arises during implementation of those innovations which require teachers and/or students to engage in teaching and learning activities that are very different to their previous experiences. In those situations there are numerous reports of the considerable resistance encountered from colleagues and students.

Few granting bodies allow for the possibility of funding projects/innovations which constitute "improvements or revisions to existing practices". This situation may have contributed to the current phenomenon, in which academics are more likely to develop something from scratch than to use resources developed elsewhere, simply because there is a lack of opportunity to gain the funding often needed to make the revisions required for use in a different context. Instead, the focus has been on the development of innovations which are "new".

Rather, the concept of "renovation" instead of innovation may well be a more cost-effective approach to achieving the goals of granting bodies. An approach that allows projects to be funded which seek to "improve or revise existing practices" may well result in enhancements to teaching and learning that are based on the considerable evidence about good practice that already exists in the literature, but which are often not implemented in practice.

The nature of innovations

As noted earlier, what seems to lie at the core of confusion about what constitutes an innovation in higher education, is the concept of innovation as a product or process that is, of itself "new". In this section I consider some of the dimensions of the innovations themselves, beginning with consideration of what the innovation or change is.

Product versus process innovations
Innovations might be described as either 'products' or 'processes'. Product innovations are described by Tornatzky & Fleischer (1990, p.20) as "those which are ends in themselves" and by Tidd et al. (1997) as

"the things which an organization offers". In contrast, process innovations are "those adopted as instrumental to some other end" (Tornatzky & Fleischer, 1990, p.20) and as a "change in the ways in which [products] are created and delivered" (Tidd et al., 1997).

Typical teaching and learning "product" innovations might include CD-ROMs or websites containing multimedia databases of subject resources, simulated laboratory exercises, databases of multiple choice questions, and 'trigger' videos. Typical "process" teaching and learning innovations might include online role-play simulations, the use of problem-based learning, peer-assessment and criterion-based assessment.

The extent to which a product or process must change in order for it to be considered an "innovation" is also relevant to this discussion.

Radical versus incremental innovation
This work originated with the notion of "routine" versus "radical" innovation first proposed by Nord & Tucker (1987). They distinguished routine innovation as "the process of introducing "something" that can be implemented with only minor adaptations of existing organizational routines and that fits within the existing norms and values of organisation members" from radical innovation, which is defined as "the process of introducing something that is new to the organization and that requires the development of completely new routines, usually with modifications in the normative beliefs and value systems of organization members" (p.41).

Based on this work, more recent authors (Tidd et al., 1997; Tornatzky & Fleischer, 1990) have labeled these different approaches as "incremental" versus "radical", the former indicating change of a minor nature, while the latter is intended to convey significant change which transforms practice.

The question of whether incremental or radical changes/innovations are more, or less, likely to result in widespread dissemination and better outcomes is highly contested. On the one hand, proponents of some process innovations such as continuous improvement (usually as part of a Quality Cycle) would argue that incremental changes achieved over a number of cycles of planning, doing, evaluating and improving have long lasting consequences. Westera (2004) claims that in education the "incrementalists outnumber the transformationalists by far" (p.509), since they are a group comprised largely of teachers who can continue to build on previous practices.

The critics of incremental change however, believe that it is not possible to achieve the major changes needed simply by making small changes to existing products/ processes. Seymour Papert is one such critic, arguing that "One could not move from a stagecoach to a jumbo jet by making a series of small improvements" (Papert, 1997). Similarly, Christensen (1997), in his well known book about 'disruptive' technologies, writes that many organisations are actually weakened because they are so focused on listening to customer feedback and making incremental changes to their products and processes, that they fail to see the "disruptive" or radical innovations emerging.

What constitutes dissemination?

Although often used synonymously, many authors quite rightly make a clear distinction between the terms "distribution" and "dissemination".

In defining the former for example, Stokking (1996, p.269) distinguishes three kinds of *distribution,* all of which involve the dissemination of information. This 'distribution' can be:

- an *activity* – "a series of conscious actions, planned by persons and organizations and intended to make something known or to be sent to other persons or organizations"
- a *process* – "the fact that, either as a result of consciously planned actions or unplanned actions, ideas and materials are transferred between persons" resulting in the ideas and materials becoming known to more people
- a *result* – a snapshot, "the degree to which the ideas and materials are known to and possessed by individuals at a given moment in time".

With these distinctions in mind, the range of *distribution activities* discussed in the literature include production of websites, papers at conferences and other symposia, submission to Clearinghouses and other similar databases.

Another way of understanding dissemination beyond the usual quantitative descriptions of use, is contained within Coburn's (2003) four levels of "scaling up" an innovation. These levels relate to:

1 *depth* – the innovation has resulted in change in the classroom that "goes beyond surface structures or procedures such as changes in materials…to alter teacher's beliefs … and pedagogical principles" (p.4)
2 *sustainability* – the change, as described above is sustained over time in the original and subsequent contexts
3 *spread* – the innovation spreads to a greater number of contexts, and
4 *shift in reform ownership* – "ownership" of the innovation shifts from the original innovator to the adopter.

This framework presents a useful way of viewing the fate of innovations some time after their original implementation, an area which has so far been neglected in the literature.

Case study: A role-play simulation for teaching Middle-East politics

The project chosen for this case study is an online role-play simulation, developed with initial funding of $33,165 from the Committee for the Advancement of University teaching (CAUT) in 1994. In terms of the discussion of innovations from the literature described above, the role-play simulation is an example of a 'process' innovation and one which is radical in nature (rather than incremental). Unlike many projects funded ten years ago, the project is still in use, having moved with Dr Vincent when he transferred to Macquarie University. It has also been widely taken up by others in a range of contexts.

Background to the simulation

This project had its origins at the University of Melbourne in the late 1980s where it was the brainchild of Dr Andrew Vincent (now at Macquarie University) and Dr John Shepherd (now at the University of New South Wales). Dr Vincent was concerned that, in order to learn about the complexities of politics in the Middle East, his students needed an opportunity to engage in more authentic learning activities than those afforded by the reading of books. Whilst on study leave in the United States, he encountered the use of role-play and introduced it in his classes at The University of Melbourne using the technologies of paper, pencils and "runners" to carry messages between classrooms.

The Political Scientist Dr Vincent met the Computer Scientist Dr John Shepherd by chance, and the latter became a partner in the project, contributing his particular expertise in information and communication technologies to facilitate electronic communication between the teams of students who were playing various roles in the simulation. The CAUT grant enabled them to develop more sophisticated software to manage the role-play simulations.

Aims

The purpose of the role-play simulation was for students to gain:

- an understanding of negotiation and decision making skills
- an appreciation of the inherent complexities of social systems
- computer/ network skills
- an enhanced understanding of Middle-East politics (Alexander & McKenzie, 1998).

Design and activities

Some ten years on from the original simulation, the project still operates in very much the same way as it was in 1994, although with the addition of some new ICTs. The original project design is considered to have been successful.

Students still work in small groups of 3 or 4, with each group being allocated the role of a person or organisation that is prominent in the Middle-East. Over a period of approximately 2–3 weeks, each group develops a detailed profile of the role they are playing, which they then post on the web for other students to view. Once the profiles have been completed, Dr Vincent releases a scenario of an event that is likely to happen in the Middle-East.

Over the next 3 weeks, students participate in the simulation asynchronously, working to advance the interests of the role they are playing. A small group of "controllers" monitor the simulation, ensuring its fidelity. Finally, a live teleconference is held where students discuss issues that have emerged during the simulation. More often than not, the simulations have involved students from other countries, and this live teleconference provides an important opportunity for them to "meet", and debrief the entire activity.

In the next section, both the distribution and the dissemination of this project are discussed using Coburn's (2003) work on scaling up an innovation as a framework for analysis.

Dissemination of the simulation

Spread
The first criterion for analysing the degree to which an innovation has been "scaled up" is that of its spread. In this case study there is evidence of the project having been disseminated:

- within the same department as the original project
- within the same university in different disciplines
- within different universities in the same and different disciplines, and
- within the different contexts of school education and the armed forces.

The project was taken up by others working in Dr Vincent's original department at the University of Melbourne. The initial "distribution" mechanism that enabled this to happen was the opportunity for participation in the original project. Mr Roni Linser was one of the original controllers for Dr Vincent's early simulations when email was the only technology used to support communication. When Dr Vincent left the University, Mr Linser continued the simulations because he thought they were the best teaching method for Middle East Politics he had ever encountered. He continued to run the simulations every year from 1994 to 2002, and was instrumental in persuading a number of his colleagues, both within his department and outside it, to use simulations in their teaching. The role-play simulations have now been used in a variety of political science courses "including Middle-East politics, World Politics, Theories of Power, Russian Politics, Australian Foreign Policy, and International Politics of the Asia-Pacific" (Linser & Ip, 2002).

When his contract expired at the end of 2002, Mr Linser left the University of Melbourne and, in partnership with Albert Ip, formed the company Fablusi Pty Ltd, whose major product is a Role-Play Simulation Generator. Since his departure all the simulations in Political Science appear to have ceased and the University no longer offers the Middle East Politics options. However, it is noteworthy that the innovation continued for almost ten years despite the original developer having left the department.

The simulation has also been adapted and embedded within the same discipline area in different universities. Several Political Science Departments now make use of role-play simulations in their teaching, and most academics cite Dr Vincent's work in their papers describing their work. For example, at the University of Western Australia, Dr Samina Yasmeen, as part of a Committee for University Teaching and Staff Development (CUTSD) grant conducted a simulation "based on an international scenario which required resolution by members of the UN Security Council" (Kinder, Fardon & Yasmeen, 1999). The initial simulation (1998) differed from the Vincent approach in that each student (rather than a group of students) was assigned a role, and the simulation was conducted entirely face-to-

face within each of the tutorial groups. After an evaluation of the initial simulation, the second version made use of Internet-based software, such as a bulletin board and chat rooms, for all communications between participants. It is also noteworthy that this project was funded by CUTSD as an innovation. In this case the innovation was not new to the market-place or the discipline, rather it was new to the individual and the department.

In 1997, Dr Vincent was invited to present his work on role-play simulations to a forum at the University of Technology, Sydney (UTS), where several of the academics present became interested in the approach and subsequently adapted it to their own teaching.

A group of academics in the Faculty of Engineering at UTS, who were teaching the subject *Technology Assessment,* were concerned that their students only ever had the opportunity to learn the socio-technical aspects of engineering and, having heard about Dr Vincent's simulations, thought this would be an ideal way for the students to engage with the political dimensions. Thus, in 1999 the Engineering students from UTS joined the Political Science students from Macquarie University and from the University of Maryland in the United States, in a simulation which was tailored to include roles for technical specialists around the area of water management.

Also present at this seminar, Associate Professor Mark Freeman from the Faculty of Business perceived the advantages of the role-play simulation to be that they are "engaging for students, complex and requiring them to reconcile ambiguity". He thought they would "give students a motive for stepping in the shoes of someone who thought differently" and that was of enormous appeal to him.

In 1998 he and his colleague (Professor Michael Adams), adapted the simulation for use in teaching the Finance subject *Securities Market Regulation* with research assistant John Capper supporting its evaluation. This subject involved students in understanding the regulation of securities markets where there are two conflicting paradigms – Finance and Law. The former has efficiency solutions as the primary concern, whilst equity is the concern of the latter (Freeman & Capper, 1999).

The organisation of the simulation differed in three ways from the Vincent approach:

- individuals (rather than groups of students) were allocated a role
- the simulation was conducted anonymously such that the students were unaware of which of them was playing which role (although this was revealed after the very end of the simulation in the debrief activity), and
- the simulation was conducted entirely online (rather than the combination of online and face-to-face) although the debrief was conducted face-to-face.

Professor Freeman noted a number of challenges in adopting the role-play simulation approach. They included: persuading his co-teacher on the subject to participate; finding ways of making his own subject interesting and appealing; lack of specific guidelines to follow in terms of what "steps" to take in setting up the simulation; and coming up with scenarios that would be inclusive of all participants playing individual roles (and to do this every year). Last but not least, he had to persuade his students that this very different way of learning, which takes a lot of work on their part, would be to their benefit.

Professor Freeman received considerable recognition for his work:

- the simulation was recognised by the Australasian Society for Computers in Learning in Tertiary Education (ascilite) in 1998 with the "Best web-based teaching project" award
- his 1999 paper describing the simulation was published in the Australian Journal of Educational Technology, and
- he was promoted to Associate Professor (and believes that the success of the simulation contributed to this).

Finally, the project has been adopted in a context other than higher education through the use of simulations in secondary schools. In New South Wales, a number of schools have participated in the role-play simulations as a direct result of a series of teachers' conversations with Dr Vincent about the success of his work in this area.

The first school-based simulation was conducted in 2001 with students taking the Arab-Israeli conflict option for year 12 Modern History in two Sydney public high schools. In 2002, the simulation was run for year 11 students only, and in 2003, they were joined by a third school.

One of the first teachers to see the potential of the simulations was Ms Dulcie Miltiades, who "wanted to give kids a greater understanding of what is happening in the Middle-East". Although teachers can be enthusiastic in their teaching, and can make use of excellent text-books on the subject matter area, she believes that the simulations provide an opportunity for the students to play out roles and actually "take on what is happening".

The simulation itself took place over three weekends and two school weeks. This is less than the original three week time period allocated, but the reduction in time was thought necessary because of the "consuming nature" of the simulation. In common with reports of the operation of the simulation in higher education, Ms Miltiades reported that students were participating in the simulation "all the time – during their lunchtimes, evenings, and even at 2a.m. there have been kids logged on".

At the conclusion of the simulation period, students meet face-to-face at a "Peace Conference", which is used to de-brief the experience, and students typically dress in the role of the character they have been playing.

Once again, the success of the simulations seems to have been directly attributable to the enthusiasm of a small number of dedicated individuals, without whom the simulations would almost certainly not have commenced, nor been adapted for secondary school use. It is clear that Ms Miltiades has been instrumental in the success of the simulations within schools, and has spent many hours of her own time in these activities, with little or no external recognition for her efforts. She also acknowledges the Macquarie ICT Innovations Centre, without whose support she doubts the simulations would have continued.

Depth
There is clear evidence that the simulations have resulted in a significant change to teaching approaches that go beyond the simple development of "teaching materials" to support a deeper approach to student learning. The higher quality student learning outcomes resulting from use of role-play simulations have been widely reported (Vincent & Shepherd,1998; Freeman & Capper, 1999; McLaughlan & Kirkpatrick, 2001) but space precludes their further discussion here.

Sustainability
There are many levels at which this case study could be analysed in terms of sustainability. On the one hand, the innovation has continued in at least two different universities for a significant period of time (10 years in one, and 8 years in another). However, that sustainability appears to be related to the presence of particular individuals, be they the originator or the enthusiastic adopters of the project. When that person leaves the department or university, the simulation invariably ceases in that context, but from early evidence, appears to be carried into the next context.

Shift in reform ownership
One of the apparent strengths of this process innovation is the high degree of "ownership" afforded to adopters, each of whom has made the simulation their own, through both minor and major modifications to the process and products used to conduct them in different contexts.

This shift in ownership has been facilitated through a further project, funded specifically for this purpose. In 2000 the Australian Universities Teaching Committee (AUTC) commissioned a project entitled "Information and Communication Technologies and their role in Flexible Learning" which aimed to assist academics to create high quality, flexible learning experiences for students by:

1 identifying high quality learning designs used in higher education
2 selecting those suitable for redevelopment in the form of reusable software, templates and/ or generic guidelines, and
3 developing those reusable resources and making them accessible from a central web site.

After an extensive review, role-play simulation was selected as one of the high quality learning designs to be showcased. The project website includes a description of role-play simulations, and a number of case studies (including the Middle-East Simulation), with guidelines and advice on how academics might go about designing and implementing them. Provision of these guidelines greatly simplifies the operation of online role-play simulations, facilitating the shift-in-ownership needed for scale-up of this innovation.

Distributing and disseminating innovations

In analysing the dissemination of the original project, a number of 'distribution' mechanisms were evident and were clearly critical to the eventual dissemination of the project. They were:

- the opportunity for potential adopters to take on a legitimate role within an early phase of the innovation, enabling them to see the value of the project to enhancing the quality of learning
- publication of a paper in a journal by the original innovator describing the innovation;
- presentation of a seminar on the innovation at another university
- the winning of awards for teaching and learning and resulting high profile of adopters of the innovation
- presentation of subsequent projects at conferences
- publication of papers in journals and conferences by adopters describing the adoption and adaptation of the innovation
- opportunities for conversations with potential adopters.

These distribution mechanisms were necessary but not sufficient to guarantee the eventual dissemination or 'scaling up' of the project. There was evidence that, having encountered the idea of the role-play simulation, the take-up or dissemination was influenced by:

- the perception of academics/teachers that role-play simulations would increase the quality of student learning outcomes
- existence of a champion/s of the innovation (other than the original developer) who was/were instrumental in persuading others of its value
- commercialisation of the innovation process, providing a set of tools that make it possible for others to adopt the innovation
- enthusiasm of participating teachers
- ease of adaption of the simulation to teachers' own context and values.

Conclusions

The case study highlighted above is an excellent example of an innovation in teaching and learning that is radical in its nature and which constitutes a teaching process (rather than product). The project has been widely disseminated beyond both the origin of the project and to new marketplaces. Critical to the success of this dissemination was the existence of a multi-faceted distribution mechanism involving more traditional presentations at institutions and conferences, publishing of articles, and production of templates which make the project easier to adopt. The project also facilitated participation by others, enabling them to see first hand the potential benefits of engaging with the project.

The outcome of the distribution of the project was been a wide adoption or scaling up of the project than is usual. This appears to have been the result of academics' perception of the value to students of the participation in such a learning activity, the ease of adaption of the project to different contexts, and the enthusiasm of adopters for promoting high quality learning experiences.

There are clearly opportunities for others to adopt this innovation, yet the radical nature of this project requires both time and money for an adopter to do so. While the role-play simulation is new to the individual adopter, it may not be considered by a funding body to be sufficiently 'new' to warrant funding for this purpose. There is merit in funding bodies considering targeted funding to enable further adoption and adaption of such projects by reconsidering the question of to whom an innovation must be new.

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