The COHERE Group

About the Authors

This paper is a collaborative project by the Collaboration for Online Higher Education Research (COHERE), the membership of which includes the following eight research intensive universities and their respective COHERE project directors: Katy Campbell, University of Alberta; Randy Garrison, University of Calgary; Randy Barkhouse, Dalhousie University; Virginia Gray, University of Guelph; Walter Archer and Kathleen Matheos, University of Saskatchewan; David Kaufman, Simon Fraser University; Tom Carey and Don Kasta, Waterloo University; Ron Owston, York University.

Abstract

The evolving use of learning technologies and systems, such as learning object systems, to support more social learning environments in which learners have more agency than ever before to construct their own learning experiences is an innovation that involves both faculty and learners in a process of difficult sociocultural change. Programs of faculty support that acknowledge that faculty's learning needs extend beyond the development of technical skills to the development of new pedagogical skills are indicated.

This paper argues that the evolving concept of learning objects systems, and the "economy" that is emerging around the idea of sharable, reusable learning objects managed by repositories, presents new challenges and opportunities for our community. Faculty working with these systems may need to be supported through a personal process of reconceptualizing the nature of teaching and learning within these environments. This process of personal transformation has the potential for change in institutional policy and practice, the institutional cultural change of which Tony Bates (2000) and others speak (cf. Advisory Committee for Online Learning, 2000). The Collaboration for Online Higher Education Research (COHERE) is an alliance of eight research-intensive Canadian universities that is examining these challenges through a multi-pronged research program, one focus of which is supporting faculty as they research their own practice related to technology-enhanced teaching innovations. More specifically, this paper is itself a collaboration among the COHERE partners to share our collective belief about the potential for faculty and institutional transformation through participation in these "e-learning evolutions".

Rsum

L'évolution de l'utilisation des technologies et des systèmes pédagogiques, tels que les systèmes d'objets d'apprentissage, en vue d'assurer le soutien d'environnements d'apprentissage plus sociaux, dans lesquels les étudiants n'ont jamais autant eu le pouvoir d'élaborer leurs propres expériences d'apprentissage, est une innovation qui implique à la fois les facultés et les étudiants dans un processus de changement socioculturel difficile. Les programmes de soutien des facultés, qui reconnaissent que les besoins en apprentissage de ces facultés vont au-delà du développement des compétences techniques vers le développement de nouvelles compétences pédagogiques, sont indiqués.

Cet article soutient que le concept évolutif des systèmes d'objets d'apprentissage et l'économie apparaissant autour de l'idée d'objets d'apprentissage partageables et réutilisables, gérées par des logithèques, présente de nouveaux défis et de nouvelles opportunités pour notre communauté. Les facultés qui travaillent avec ces systèmes peuvent avoir besoin d'être appuyées par un processus personnel de

reconceptualisation de la nature de l'enseignement et de celle de l'apprentissage dans ces environnements. Ce processus de transformation personnelle a le potentiel de changer des directives et des pratiques institutionnelles - le changement culturel institutionnel dont parlent Tony Bates (2000) et les autres (cf. Advisory Committee for Online Learning, 2000). La Collaboration pour l'enseigment supérieur et la recherche sur Internet (COHERE ou *Collaboration for Online Higher Education Research*) est une alliance de huit universités canadiennes à prédominance de recherche qui examinent ces défis par le biais d'un programme de recherche à plusieurs branches, dont l'un des centres d'intérêt est le soutien des facultés pendant qu'elles recherchent leurs propres pratiques en relation aux innovations pédagogiques perfectionnées par la technologie. Plus particulièrement, cet article est lui-même une collaboration entre les partenaires de COHERE, afin de diffuser notre assentiment commun au potentiel de transformation de la faculté et de l'institution par le biais de leur participation à cette évolution de l'e-éducation .

Introduction

"The process of using technology to improve learning is never solely a technical matter, concerned only with properties of hardware and software. Like a textbook or any other cultural object, technology resources for education - whether a software science simulation or an interactive reading exercise - function in a social environment, mediated by learning conversations with peers and teachers."

Bransford, Brown, and Cocking, 1999, p. 218

Some would argue that technology is an agent of change (cf. Bates, 2000; Bowers, 1988; Bryson & deCastell, 1998; Cockburn & Ormond, 1993). If this is true, major technological innovations can result in entire social paradigm shifts. Automobiles and telephones are often cited as examples of technological innovations that have had extraordinary social, political, and economic impact.

In the educational and communications fields networked communications systems, from email through synchronous text chats, have encouraged educators to design for social learning environments supported through constant, collaborative conversations among learners previously excluded by virtue of geographical location. Concomitantly, these environments may force a shift in the locus of intellectual authority and power, permitting "equal air time" to a multiplicity of experience and expertise and access to sources of information that had not previously been available. This shift has, in many cases, resulted in fundamental changes in the relationships among the participants that may be characterized as sociocultural changes. That is, the evolving use of learning technologies and systems, such as learning object systems, to support more social learning environments in which learners have more agency than ever before to construct their own learning experiences is an innovation that involves both faculty and learners in a process of difficult sociocultural change. Programs of faculty support are indicated that acknowledge that faculty's learning needs extend beyond the development of technical skills to the development of new pedagogical skills.

This paper argues that the evolving concept of learning objects systems, and the "economy" that is emerging around the idea of sharable, reusable learning objects managed by repositories, presents new challenges and opportunities for our community. Faculty working with these systems may need to be supported through a personal process of reconceptualizing the nature of teaching and learning within these environments. This process of personal transformation, from the ground up, has the potential for change in institutional policy and practice, the institutional cultural change of which Tony Bates (2000) and others speak (cf. Advisory Committee for Online Learning, 2000). The Collaboration for Online Higher Education Research (COHERE) is an alliance of eight research-intensive Canadian universities that is examining these challenges through a multi-pronged research program, one focus of which is supporting faculty as they research their own practice related to technology-enhanced teaching innovations. More specifically, this paper is itself a collaboration among the COHERE partners to share our collective belief about the potential for faculty and institutional transformation through participation in these "e-learning evolutions". Much of our work in 2001-2002 has revolved around aspects of the so-called new economy reflected in the development of learning object systems.

Learning Object Systems: A Newer Take on Instructional Media

Learning systems based on the learning objects present yet another technology-based learning environment with attributes that can enable learner-centered experiences and promote higher-order learning, *if* evidence-based pedagogical considerations are taken into account in their development. Although the literature has mostly focused on technological characteristics and the development of international standards for interoperability, more recently researchers and developers have turned their attention to the quality of the

contexts in which these learning objects will be used (Bannan-Ritland, Dabbagh, & Murphy, 2001). For example, the IMS Global Learning Consortium (http://www.imsproject.org/), a global consortium with members from educational, commercial, and government organizations, is developing and promoting open specifications for facilitating online distributed learning activities. Recently their activities focused on tools and systems such as content packaging, metadata, assessments, and others. However, in February 2001 IMS constituted a *Learning Design* Working Group, the leadership of which is supported through the EduSpecs Initiative of Industry Canada (http://eduspecs.ic.gc.ca)[1] , which has addressed the roles and activities of multiple "actors" in an integrated learning environment. These kinds of decisions may signal a shift in focus from the content itself to how learners interact with content in well-designed environments with other learners, teachers, and participants.

There are significant instructional differences between learning objects (and systems) and the instructional media with which we are familiar. For example, learning objects can be identified by learning need or profile; accessed, sequenced and used by many learners at once; and can be enhanced and reused multiple times in multiple learning contexts, potentially increasing in value with each use. The flexibility and adaptability of this system encourages designers, including faculty, to develop learning experiences and environments that encourage the learner to take more "executive control", or agency, in determining the structure, content, and interactions that support a learning outcome (Cobb, 1996).

Ewing, Dowling and Coutts (1996) maintain that instructional planning for technology-enhanced learning experiences has, until now, been based on identifiable outcomes with structured objectives on which activities are designed and assessed, and that the instructor's choice of learning resources is based on whether they support these structured outcomes. An alternative approach based on learner-driven decisions about the activities and resources needed at the time of the learning experience is made much more possible through the development of learning object systems (or economies) that are searchable and in which objects may be identified and accessed through online learner profiles.

Instructional Innovation and Faculty Learning

Although this idea is not new, we contend that learning how to "exploit" systems that support more learning-centered experiences encourages faculty to re-examine core values, expectations, and practices related to the teaching and learning enterprise. In this paper we propose that this process has the potential to be a transformational learning process for faculty that, at its best, results in a transformed learning environment for students. Further, as one component of higher education's project to encourage excellence in teaching we believe that post-secondary institutions must value and support the instructional expertise of their faculty, who are the instructional resources most closely committed to this goal (Cunsolo, Elrick, Middleton, and Roy ,1996).

Unfortunately, developing faculty expertise in teaching innovations has not been well-supported in the post-secondary context. This may be due, in part, to the historical emphasis of the academy on the scholarship of discovery, the scholarship of integration, and the scholarship of application, which are typically associated with the research rather than the teaching process (Glassick, Huber &Taylor, 1997). Only recently has the scholarship of teaching, defined as the initiation of "students into the best values of the academy, enabling them to comprehend better and participate more fully in the larger culture"...and the enticement of "future scholars", received increased attention (Glassick et al., 1997, p. 9). The scholarly efforts of faculty who develop and employ the use of instructional technology innovations to improve learning on campuses need to be recognized within this definition.

The principles underlying teaching excellence are inherent in the effective use of instructional technology innovations, which cannot be evaluated outside of the teaching and learning contexts in which they are used. However, the scholarship of teaching continues to struggle for attention and support within institutions of higher education, which have failed to make substantial cultural, political, and administrative changes to accommodate the changing nature of instruction. According to Seminoff and Wepner (1997), measures need to be taken to increase the value of scholarship invested in technology-based projects (see also Fitzgerald, Allen, and Reeves, 1999; Wolcott, 1997).

In this paper, we propose that learning object systems are more than technological innovations; rather, they are *pedagogical* innovations that encourage and may even require faculty to engage in a process of personal and professional change leading to the improvement of teaching. By engaging faculty in this "pedagogical conversation" we are able to support their transformation while at the same time help them shape and represent this work as scholarly activity. Ultimately, developing faculty expertise related to pedagogical innovation spawns a culture in which the scholarship of teaching can evolve.

Designs for Learning

The first decades of educational technology research were concerned with media effects on learning. This research, which was to have informed instructional design decisions about

resources and approaches, has been somewhat confounded by the incompatibility of experimental design to environments in which complex learning interactions take place among learners, teachers, and content. The media effects approach to learning effectiveness has been exemplified in the past by the "historical debate" between Richard E. Clark and Robert Kozma. Clark (1994) described learning as the acquisition of the knowledge and skills necessary to successfully complete a given task. In this view, the learner acquires the necessary skills through the transmission of information. The goal of the instructional developer, then, is to "provide the representations and other cognitive supports necessary" for learning (Nathan and Robinson, 2001, p. 76).

Kozma, on the other hand, focused on learning as an "active, constructive process whereby the learner strategically manages available cognitive resources to create new knowledge by extracting information from the environment and integrating it with the information stored in memory" (Nathan and Robinson, 2001, p 83). Kozma describes a process in which the learner has agency, making choices that "reconfigure" the learning system in a "moment by moment collaboration" (p. 76) that reflects their learning needs at a particular time. The concept of learner agency is key here as it is central to the development of learning object systems based on learning profiles developed through actual online experiences.

More traditional computer-based environments have presented learning activities in packages, containing fixed resources. In constructivist environments, however, the learner acts as his/her own agent in determining progress through learning. The instructional challenge in these environments is how all participants share the representations that are embedded (Ewing, Dowling and Coutts, 1998). As the learning object economy matures, the potential exists for participants to select the representation that is most closely aligned with their personal learning needs and profiles. The term "economy", suggesting an environment in which objects are shared and recreated, and in which each "use" increases value, requires a reorientation in pedagogical design and curriculum planning. Issues related to intellectual property rights also need to be addressed as "sharing" is the coin of the realm in this new economy and has both cultural and political implications for faculty. The Multimedia Educational Resources for Learning and Online Teaching, or MERLOT (http://www.merlot.org), is one model of an economy that has attempted to address these concerns by 1) establishing discipline-based boards of peer reviewers, and 2) pointing to the location of learning objects, which may reside on the faculty member's own server, rather than trying to negotiate rights management (MERLOT is described more fully on page x). Faculty development and support planning should align with these important concerns.

Faculty And Institutional Transformation

Social changes related to the "new economy" require a corresponding change in the way we view the instructional forms of higher education. These changes, tied inextricably to developments in instructional technology, require environments that remain accessible and flexible throughout as learner's lifespan. Koper (2001) believes that the "dead mechanistic computer applications with an abundance of structured teaching materials" of the 1980's must be replaced by environments in which human activity and interaction must be central and provided through "rich, varied, professionally made and optimally pertinent content" that are adaptable (p. 31). These environments will be available through "educational institutions (that are) completely devoted to serving the individual's development and the social request for highly educated `knowledge workers'"(p. 31). Responding to these challenges requires faculty to understand learning diversity, new instructional methods and, more importantly, a modification and enrichment of personal beliefs about their role as teachers, beyond simply adding new tricks to their teaching toolkits (Pearson, 1998).

Development and implementation of new, innovative models of teaching and learning is a process of both personal and institutional change (Dolence & Norris, 1995; Fullan & Steigelbauer, 1991; Hodas, 1996; Ramsden & Martin, 1996; Romiszowski, 1997; Senge, 1990). Research on instructional innovation describes the process as personally risky, yet this is the level at which transformational thinking and action occurs and is sustained. Proceeding through multiple stages, transformative learning is prompted by a "disorienting dilemma", or "trigger event", leading to a perspectives change in both worldview and curricular scope (King, 1999). Arguably, innovations such as new instructional technologies present a dilemma to faculty who have been immersed in the teacher-directed, content-centered culture of university teaching.

Innovation and transformation potentially have the most impact on other faculty colleagues and instructional practice at the level of the *personal* (Anderson, Varnhagen, & Campbell, 1998). At this level, Kershaw (1996) believes that instructional technology innovation encourages "people to change the way they do things and the way they think about their roles in the organization" (Kershaw 1996, p. 44).

The learning object economy, with its emphasis on interoperability, reusability, and reproducibility, is an instructional innovation that encourages a cultural transformation on many levels. On the *personal* level, faculty may confront traditional notions of intellectual property and ownership; instructional autonomy; professional relationships; and issues of pedagogical power and authority. On the instructional level, instructors and departments

will consider the impact of collaborative curriculum exchange, in some cases on an international level; the integrity of a "course" or "program"; issues of learning diversity and cultural relevancy; assessment; and more participatory distributed learning environments based on communications rather than transmission. On the institutional level accessibility; "branding"; changing faculty roles and workplace models; and new learning support structures will be key issues. In all cases, institutions will become more integrated systems, both internally and externally (involving, for example, employers, libraries, and educational publishers as well as their own internal resources). However, as Koper (2001, p. 30) notes, just because institutions use integrated environments it still does not say anything about the extent to which they are innovating their education. An integrated environment can involve substitution, innovation *or* transformation.

A long-term impact on both personal and institutional levels requires a comprehensive program of faculty professional development, support for instructional planning and development, careful evaluation of learning effectiveness, and sustained coaching and mentoring during initial implementation and continued delivery (Bates, 2000). Irani and Harrington (2000) characterize programs of support for faculty efforts to integrate information and communications technology into instruction as the "single most important information technology issue confronting American colleges and universities" while providing adequate user support ranks second (p. 38). Challenges include careful institutional planning, faculty-student development teams, apprenticeship programs, celebration of master teachers using technology, and recognition for faculty who represent their work as a scholarly contribution that has been acknowledged by their peers (as Merlot's peer review boards do). At the same time, centers of faculty support within institutions must also refocus their efforts from support for the production of learning resources to the support of faculty learning to identify, use and evaluate instructional technology innovations such as learning objects.

The Social Context for Learning Systems

In an integrated, adaptable environment, such as we have been describing, learning activities and interactions are central. As a social system, the learning environment is dependent on human interaction rather than on resources. In other words, how humans act together on the activities and resources in the environment create the learning experience. This view of a learning environment, primarily a model of a social reality, suggests that activities take place in a group process of collaboration and communication, although learning interactions may unfold asynchronously as well as synchronously (Koper, 2001).

Delivery technologies, or systems, have shifted from the directive role of electronically presenting information to a responsive role in providing support for the learner in constructing knowledge and deriving meaning. This shift in functionality reflects a shift in pedagogical control from the computer/instructor to the learner as decision-maker. As Ewing and his colleagues (Ewing, Dowling & Coutts, 1998) point out, traditional perspectives on structuring learning tasks, based on systematic design principles, do not correspond easily to these environments.

Cohere'S Mission

Leveraging the elements of this interactive system forces a reconceptualization of learning design, away from a systems approach, in which external conditions are key, or a message design approach, in which content presentation is central, towards a learning environment in which "neither the cognitive processing or the subject matter's form is central, but rather all human activity that focuses on learning something or on helping someone learn something, and the environment or context in which these activities take place" (Koper, 2001, p. 33). These reciprocal social systems, in which learning objects are acknowledged to contain cultural and contextual data, respond to the internal cognitive processes of organizing, adapting, reordering, and inventing, or reinventing (Ewing et al., 1998). The role of the learning designer, therefore, becomes less one of planning and more one of facilitating the universe of possible learning interactions that might take place. Faculty are accustomed to the culture of original production - production of knowledge products in forms valued by their disciplines. In a new era faculty will need support imagining a new role as critical consumers of knowledge products. How campus centres of faculty support for teaching respond to this challenge is the focus of much of the research agenda to which COHERE is responding.

COHERE (http://www.cohere.ca) member institutions have agreed to leverage the shared values of the institutions and the critical mass of engaged faculty to enhance learning and teaching through technology and to move toward a stronger culture of professional collaboration and scholarship in educational practices. Current partners include Simon Fraser University, University of Calgary, University of Alberta, University of Saskatchewan, York University, University of Guelph, University of Waterloo, and Dalhousie University. COHERE was born from the shared intention to enhance offerings of high-quality Internet-based programs and to integrate scholarly values and culture into learning and teaching through technology. To that end, the COHERE partners have agreed to three inter-related domains of inter-institutional collaboration:

1. Increasing flexibility and access in the post-secondary sector by establishing administrative processes to allow departments, colleges and program committees to integrate courses from other partners into their online programs.
2. Defining shared educational principles and evaluation methods which reflect the research values of the partner universities.
3. Encouraging collaborative planning and development of future, evidence-based online courses, programs, and learning objects.

As previously noted, much of the work of COHERE members has been framed by the research and evaluation opportunities and the development of models for developing faculty expertise in the scholarship of "teaching" with learning objects.

Contributing to the Scholarship of Teaching

There is some concern among the professorate that new conceptions and expectations related to the new knowledge economy have undermined the role of faculty as curriculum developers and sources of intellectual authority. An alternative view is that the new delivery and instructional technologies have the potential to increase the scholarly power of academics. Baldwin (1998) makes the argument that technology has the potential to rejuvenate academe by easing the collegial and collaborative process in research, which is no longer restricted by geography; providing new venues for communication and dissemination such as discussion lists, bulletin boards, and electronic journals; enlarging academic life by diversifying the work of faculty; offering new opportunities for developing valued expertise that complements disciplinary specialization; and loosening limitations on an academic career imposed by geographical or institutional boundaries. For example, he cites video conferencing as an example of interinstitutional flexibility in instructional delivery.

Innovations present challenges to existing patterns of work and specialization on campuses requiring institutions to work more like close-knit, integrated communities (Baldwin, 1998). We began this paper by acknowledging that instructional technology innovations require personal and institutional change, which are not well supported by an academic culture committed to the *individual* scholarships of discovery, integration, and application. However, as institutions respond to social challenges outlined here, the scholarship of teaching comes into focus. Scholarship can be enhanced by access to new experts, new forums, and new ideas about teaching and learning, but as a result of the failure to define and evaluate what constitutes the scholarship of teaching, a discourse surrounding the scholarship of teaching has not been established within the university (Cambridge, 2001). The lack of value place upon the scholarship of teaching within the university translates directly into the lack of recognition granted to the development of instructional technology innovations by faculty. The development of high quality learning environments requires a great deal of time to be devoted to instructional and technical development. This process is intimately linked with the scholarship of teaching.

Institutions of higher education have failed to make substantial cultural, political, and administrative changes to accommodate the changing nature of instruction. According to Seminoff and Wepner (1997), measures need to be taken to increase the value of scholarship invested in instructional technology innovations. Policies and guidelines that structure the faculty reward system need to be redeveloped. In some instances, the limited recognition accorded faculty for their work with educational technologies has hampered their chances for peer recognition (Fitzgerald, Allen, and Reeves, 1999). Instructional technology innovations are often not included in decisions about faculty rewards because of the lack of established criteria necessary to evaluate such projects and the lack of knowledge concerning how to present the projects in a scholarly manner (Seminoff, & Wepner, 1997).

Recently, several national and international initiatives have been established to address this challenge. MERLOT is one such project that provides a cooperatively developed, free, Web-based resource where faculty can easily find learning objects with evaluations and guidance for use. MERLOT leverages academic regard for peer review through a process that ensures that materials within the collection "address significant theoretical or research issues and are contextually accurate, pedagogically sound, and technically easy to use" (Hanley and Thomas, 2000, p. 16).

The MERLOT peer review board consists of faculty from 23 partner post-secondary institutions. Peer review teams are discipline-related and include faculty who are nominated by their colleagues for their disciplinary expertise, excellence in teaching, and experience in using technology in teaching and learning, and connections with their discipline's professional organizations. The MERLOT organization provides facilitation and training to peer review teams to plan and conduct reviews, add materials to the collection, and design the collection's categorization scheme. Thus, at evaluation time faculty who have developed learning objects are able to represent their work as scholarship at evaluation time. The peer evaluations of learning objects are equally valuable to faculty who are assured of the quality of the learning objects that they intend to include in their own learning designs. Tom

Carey, at the University of Waterloo, and his colleagues in Ontario (Carey, Harrigan, Palmer and Swallow, 1999) have undertaken a similar project in which faculty that contribute to a learning object economy are able to represent their work as scholarship through a "citation index".

Cohere Planning for Faculty Development

One of the major foci for COHERE in 2002-2003 is the commitment to support opportunities to enhance faculty development in the use of online teaching and learning in its institutions and beyond. The broader goal is to facilitate the development of faculty leaders to act as champions, coaches, and online learning knowledge generators within their particular fields of study. Several initiatives have been proposed or are currently in preparation that will address the use of knowledge management concepts to create virtual communities of inquiry and an instructional development resource repository, an extension of the learning object concept, which will be available to instructional developers in COHERE institutions.

Developing faculty expertise through action research is a promising model, which emphasizes the development of work in discipline-specific online learning environments as a scholarly endeavor within academic disciplines, through interdisciplinary research teams. As the culture of the post-secondary institution places high value on discipline-specific scholarly work, faculty-led research on "problems of practice" related to online learning effectiveness may diminish encourage cultural resistance.

A shared goal of COHERE involves fostering discipline communities in which some members are scholars in technology-enhanced learning in the discipline, and most members are scholars in more traditional areas who then *apply* scholarly results on technology-enhanced learning as they transform their teaching practices.

Although each new technology has promised to transform teaching and learning, the conceptualization of the learning object economy as process-oriented rather than delivery-oriented could encourage the kind of social and cultural change Koper, (2001) and others have described. Global interest in, and adoption of, standards related to learner accessibility and profiles, content packaging and management, and learning design may facilitate for faculty the developmental process of both instructional planning and development of the learning objects that are contextualized in rich, diverse learning environments. This development process will be much enhanced by, and may even require, the kind of inter-institutional collaborative work undertaken by partners of alliances like COHERE. Our goal is to continue to participate in these research conversations as joint initiatives begin to bear fruit.

Supporting Faculty Transformation: The First Step, not the Last

COHERE is one example of a collaborative effort to recognize and support the scholarly and personal goals of faculty as they find ways to become involved in the global project of developing new learning environments for diverse learners and new learning communities. Although support for faculty learning is perhaps the key to sustained institutional cultural change it often seems to be the piece that is planned last. An innovation such as the learning object economy provides an impetus and a context for transformational change. Too often we focus on the technological innovation itself rather than the social, cultural, and economic impact it may have at the level of the personal. We believe that the level of the personal is where transformation in thinking and practice will occur and that this is the level at which it must be supported.

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Endnotes

1. Industry Canada has also been key in the creation and ongoing support of the Collaboration for Online Higher Education and Research (COHERE), an "alliance of leading Canadian research universities, working together to improve access to online learning opportunities and to integrate online learning with our research culture and values" (http://www.cohere.ca/).

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