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Research and innovation in teaching and learning are prime topics for the *Journal of Instructional Technology and Distance Learning* (ISSN 1550-6908). The Journal was initiated in January 2004 to facilitate communication and collaboration among researchers, innovators, practitioners, and administrators of education and training involving innovative technologies and/or distance learning.

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IJITDL is committed to publish significant writings of high academic stature for worldwide distribution to stakeholders in distance learning and technology.

In its first decade, the Journal published more than 600 articles, 7500 pages of research and theory by over 1,000 authors. It logged over eight million page views and more than a million downloads of monthly journals and eBooks. Many authors benefited from refereed publication for retention, promotion, tenure and advancement in their profession.

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Editorial

End of a Decade
The Editors of IJITDL

January 2004 saw the first of 120 issues of this refereed Journal published monthly. This grand accomplishment represents a tremendous amount of work by its volunteer readers, editors, web-publication staff, managers and advisors. We published over 600 articles and 120 editorials, more than 7500 pages of research and theory by over 1,000 authors. Many authors needed refereed publication for retention, promotion, tenure and advancement in their profession.

The web page recorded in excess of 50,000 page views every month while downloads of the entire journal, averaging more than 64 pages, exceed 10,000 per month. HTML pages were discontinued in 2012 to accelerate publication after loss of a number of our senior editors.

We are indebted to Patrick S. Portway, Applied Business teleCommunications and Telcon; John Flores and Board Members of the United States Distance Learning Association, and our many professional associates and readers who tirelessly volunteered their services. Many of our editorial staff and authors previously wrote, refereed, edited and published Ed-at-a-Distance and USDLA Journal.

In 2003 USDLA Journal ceased publication, but authors found us and continued to send articles. The International Journal of Instructional Technology and Distance Learning was crafted by Drs. Linda Wojnar and Lawrence Tomei from Duquesne University in Pittsburgh PA in collaboration with Drs. Donald and Elizabeth Perrin from San Jose State University. Initial funding came from Duquesne University and DonEl Learning, Inc. Duquesne University withdrew from the partnership after the first year.

For its second decade, there are elaborate plans for building the journal, but much of what is required is not available from volunteers. We are opposed to advertising as a source of revenue. What we seek is a sponsor or sponsors that have no vested interest in distance learning *per se* that are committed to improvement of learning and teaching in all nations and cultures. We have rarely solicited papers for the IJITDL. They just keep on coming. Thank you! Almost 67% of submissions are accepted for publication.

We are in an era where technology and research on human learning open new opportunities for advancement. Policies and laws that were once protections have become obstructions to change. Privatization of information and enforcement of outdated laws and regulations are ever present dangers to teachers who want to bring the best available resources to their students. It is time to update patent, copyright and intellectual property laws so that open systems can function as a global benefit for all people now and in the future. We expect so see many articles discussing these problems in future issues of the Journal.

Editor's Note: As every craftsman knows, a work of art is best produced using the right tool, exploiting its advantages and overcoming its limitations. The body of knowledge for designers and practitioners in distance learning continues to grow and would benefit from organization as a taxonomy. This insightful article is an excellent step forward in organizing and classifying delivery modes.

Toward a Taxonomy of Distributed Learning Delivery Modes

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Abstract

The massive integration of technology-mediated delivery modes into higher education is reconfiguring the traditional face-to-face content delivery paradigm. In order to fully exploit the transformative power of these emerging distributed learning delivery modes, it is imperative for policy-makers, administrators, practitioners, and faculty to understand the delivery modes' characteristics, requirements, benefits, and drawbacks. To contribute to this understanding, this paper proposes a taxonomy, which classifies various delivery methods based on four dimensions: location, time, pedagogy, and technology. The use of this taxonomy will allow institutions of higher education to better understand the technical, pedagogical, and logistical characteristics of each delivery mode, and that this understanding will enable educators to consider blending several delivery modes in order to offer more effective learning experiences to their students.

Keywords: distance education; distributed learning; delivery modes; e-learning; online learning; Web-based learning; taxonomy;

Introduction

At the risk of stating the obvious, the current infusion of technology is reconfiguring the higher education landscape, transforming teaching, learning, and administration (CAUDIT, EDUCAUSE, JISC, and Foundation, 2010, Anderson and Weller 2013). Driven by pressures, needs, and expectations from students, from industry, and from society at large, the most obvious manifestation of this sea change is the wide adoption of technology-mediated delivery modes. By expanding the concept of "classroom" beyond conventional distance education, this adoption is easing enrollment capacity constraints, and contributing to institutional transformation, revenue generation, and renewal (Daniel 1999; Oblinger, Barone, and Hawkins 2001). Even the traditional face-to-face paradigm is being reconfigured and augmented by various technology-mediated delivery modes, including the massive open online courses (MOOCs) model (Daniel 2013; Moore 2013). As a result, universities are increasingly able to diversify their offerings and their scheduling opportunities by providing a mix of face-to-face, Web-based, and hybrid courses. This diversification has significant implications for academia, since a variety of delivery modes are becoming more and more interwoven into the everyday fabric of academic life, particularly as higher education institutions attempt to take advantage of the repertoire of various pedagogical approaches offered by these delivery modes (Dede 2000; Malikowski 2008). Unless universities make the effort to re-examine, rethink, and remap these various delivery modes to both meet curriculum needs and support student characteristics and needs (particularly those of part-time adult learners), they are unlikely to fully benefit from the potentially transformative power of these pervasive (although sometimes disruptive) technologies.

In order to benefit from this influx of technology, any higher education institution endeavoring to blend these technology-mediated delivery modes into its teaching and learning landscape needs to understand the various delivery modes' features, requirements, benefits, and drawbacks. To contribute to this understanding, this paper proposes a taxonomy, which classifies, compares, and contrasts a variety of delivery modes following four dimensions: location, time, pedagogy, and technology. In doing this, this paper's goal is threefold: 1) to fill in a significant gap in the literature, since a thorough perusal of a large number of studies about distance education (DE) did not unearth a comprehensive comparative review of various delivery modes; (2) to enable policy-makers, practitioners, administrators, and faculty to carefully consider and understand the technical, pedagogical, and logistical requirements of various delivery modes; and (3) to provide faculty with a comparative tool that should help them avoid the mere transposition of face-to-face pedagogical practices into these technology-mediated delivery modes. Use of this tool should enable faculty to overcome some of their skepticism about DE courses' quality and legitimacy, and should lessen their hesitations and anxieties about offering courses via DE.

This paper briefly defines the concept of distributed learning and then discusses the basic assumptions underlying the proposed taxonomy. Next, it examines the core dimensions associated with distributed learning. Building on these dimensions, the paper describes the various facets of a variety of delivery modes while covering their benefits and drawbacks, and then concludes with some practical recommendations.

Distributed learning delivery modes taxonomy

Just what IS distributed learning, anyway?

Although education literature abounds with various concepts and appellations (Moore, Dickson-Deane, and Galyen 2011), distance education has traditionally served as an umbrella term that covers most non-traditional delivery modes. As has been argued elsewhere, in spite of the definitional ambiguity surrounding the meaning of distance education, it is still justifiable (given the current trend toward technology convergence) to presume that the term distance education subsumes several related concepts, among them distance learning, online learning, e-learning, virtual education, Web-based learning, computer-based training, and blended or hybrid learning (Abdous 2009; Abdous and Yoshimura 2010). While keeping in mind some of the nuances associated with each concept (education vs. training, faculty-centered vs. student-centered, for example), we opt for a more inclusive concept, one capable of incorporating face-to-face delivery mode. This paper uses the concept of distributed learning (DL), rather than pure distance education. Adding to this choice, it should be noted that learning (whether at a distance or face-to-face) is not mechanically delivered per se, but rather is an interactive individual and social process facilitated by faculty, mediated by technology and intentionally initiated and accessed by students.

Broadly defined, distributed learning refers to "educational activities orchestrated via information technology across classrooms, workplaces, homes, and community settings" (Dede 2000). In this understanding of distributed learning, educational activities tend to blend the complementary strengths of face-to-face instruction with technology-mediated synchronous and asynchronous interaction and communication. This allows learning to be distributed over space and time while it extends beyond the classroom environment by using different technologies "to reach students where ever they are physically, as well as cognitively" (Walker 2003).

However, the proliferation of various technologies to facilitate synchronous and asynchronous interaction and communication makes it difficult to comprehend all of the features, requirements, benefits, and drawbacks of each delivery mode. Adding to this confusion is the burgeoning propagation of a variety of social networking applications (such as Facebook, Twitter, Pinterest, Tumblr and Google Plus). While they are only beginning to penetrate into mainstream teaching

and learning practices, these means of communication are widely used by students outside of their academic learning activities. With their powerful potential to reconfigure the dynamics of participation, interaction, and collaboration, these social networking applications are likely to contribute to the emergence of a more diverse and complex learning landscape (Ravenscroft 2009).

In the next section, this paper explains the assumptions underlying the proposed taxonomy, and offers a look at some of the commonalities and the differences observed across a variety of delivery modes, as well as at the features and requirements upon which these delivery modes are based. It considers content presentation, learning activities, synchronous/asynchronous interaction, assessment, and hardware and software requirements, as well as potential benefits and drawbacks for both students and faculty.

Distributed learning taxonomy

Keeping in mind the basic premise of taxonomies (the establishment of relationships between various items under consideration), we posit that the proposed taxonomy provides a framework to systematically review, classify, and compare various delivery modes. At the outset, please note that this taxonomy is structured around three premises:

Since they occur in a very complex cultural and technological context, teaching and learning are multidimensional by nature. They are affected by a mix of institutional, social, and individual variables, ranging from institutional resources and faculty teaching styles to student background, readiness, and motivation.

Keeping in perspective the predominant role played by technology in teaching and learning, it is important to remember that technology is not merely a passive tool, nor a partial artifact (Harpur 2006), but rather a "medium of human expression" (Murphy 1986) which is capable of shaping our habits of mind and our patterns of thinking (Morrisett 1996). Hence, in order to leverage the potential of technology to improve students' learning outcomes, it is critically important to understand the various technologies' capabilities and limitations, particularly when the ever-evolving nature of technological innovations is considered (Ravenscroft 2009).

Recognizing the transversal nature of the taxonomy dimensions, we concede that these dimensions are not mutually exclusive. While this paper attempts to provide a means to compare and contrast a variety of delivery modes, there is still a degree of overlap and redundancy across the four dimensions under consideration: location, time, pedagogy, and technology.

Having clarified these assumptions, we reiterate that taxonomies provide a basis not only for explaining and presenting complex information but also for understanding organizational phenomena (Martín-Peña and Díaz-Garrido 2008). In this sense, this proposed taxonomy is useful in helping to understand and map the characteristics and the differences among various teaching and learning delivery modes.

To contextualize the proposed taxonomy, the reader should note that it is inspired by the distributed learning environment of a public four-year research university known as a national leader in technology-mediated distance learning. At this institution, courses are delivered via a wide range of technology-mediated delivery modes including satellite broadcast courses, two-way courses, Web-based courses, live video streamed courses, and courses offered via CD-ROM and other portable devices. This taxonomy is grounded into four intertwined dimensions: location, time, pedagogy, and technology (Figure 1).
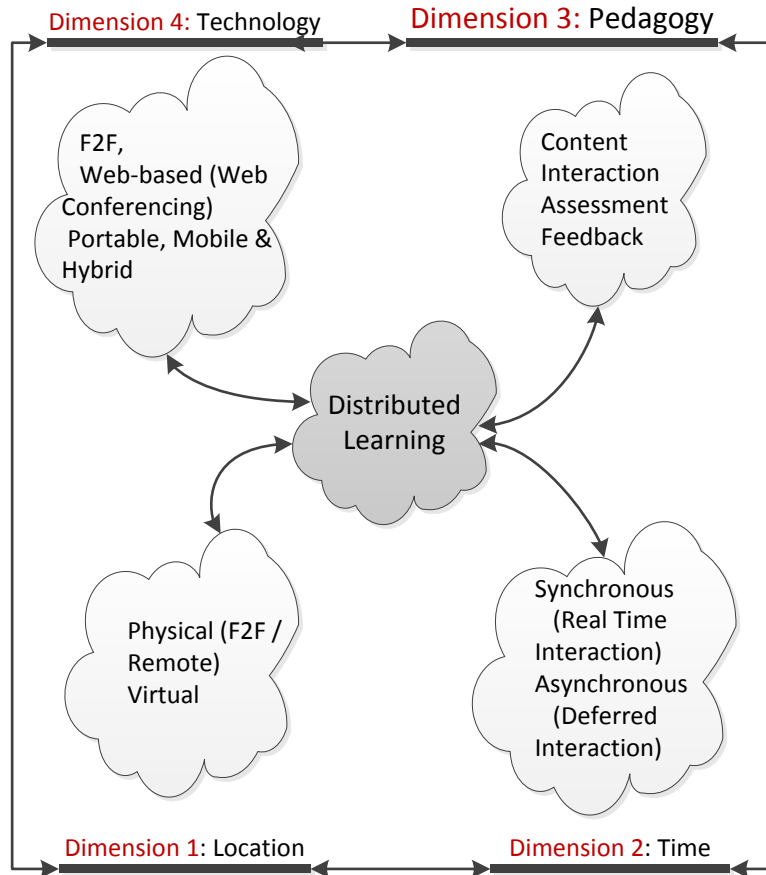
Dimension 4: Technology Dimension 3: Pedagogy

F2F,
Web-based (Web
Conferencing)
Portable, Mobile &
Hybrid

Content
Interaction
Assessment
Feedback

Distributed
Learning

Physical (F2F /
Remote)
Virtual

Synchronous
(Real Time
Interaction)
Asynchronous
(Deferred
Interaction)

Dimension 1: Location Dimension 2: Time

Figure 1. **Portrayal of dimensions in distributed learning taxonomy.**

With its underlying assumption that distributed learning can provide learning opportunities anytime/anywhere, this four-dimensional taxonomy encompasses a vast array of possible combinations and forms. To this end, the first dimension (lower left) distinguishes between the physical location (on-site or remote face-to-face) and the virtual location of the learning activity (Web-based, regardless of specific geographical location). As it expands classroom walls and bypasses traditional location constraints, the output of this dimension (i.e. flexibility in time and place of learning) is perceived to be the most important advantage of the technology-mediated delivery modes.

The second dimension (lower right) distinguishes between the synchronous (real) and asynchronous (deferred) time of the learning activity. Irrespective of the learner's geographical location, courses offered in synchronous mode allow real-time interaction between student and instructor, whereas courses offered in asynchronous mode allow only deferred interaction. Each type of interaction offer both benefits and drawbacks. Much depends on the course design and the facilitator-to-student ratio. Typically, courses with larger enrollments tend to offer less supervised peer interaction, fewer collaboration opportunities, and limited interaction with instructors.

The third dimension (upper right) discerns the pedagogical repertoire associated with teaching and learning in terms of content presentation, learning activities, interaction, assessment, and feedback. The adoption of new emerging technologies (Web Conferencing, Blogs, Wikis, etc.) is

diversifying the pedagogical repertoire. By offering access to learning resources, interaction, and collaboration opportunities, these delivery modes are renewing or rejuvenating many traditional face-to-face pedagogical practices, while posing some technical, logistical, and pedagogical challenges to both faculty and students.

The fourth dimension (upper left) clarifies the various technologies (hardware and software) associated with various delivery modes (F2F, Web-based, portable and mobile devices, and hybrid). Since technological innovations are ubiquitous and on-going, some delivery modes are likely to leverage these innovations, to facilitate remote access and participation and to encourage interaction, collaboration, and active participation. However, keeping up with ongoing innovations can be challenging and costly, hence the need for a DL multi-delivery mode strategy that integrates and justifies the academic value of these technologies.

As it keeps these assumptions and dimensions in perspective, this paper attempts to organize various delivery technologies into five different delivery modes. More specifically, it uses technology (hardware and software) as a delineating variable to identify the following delivery modes: face-to-face, Web-based, portable media, mobile devices, and hybrid. With the exception of delivery face-to-face (which can rely on some presentation technologies, ex. projectors and/or PowerPoint), the delivery modes described herein are technology-driven and leverage computing, networking, and wireless power. Additionally, even though most of the delivery modes use a course management system for logistics and for course content delivery, each delivery mode offers unique, non-redundant attributes that enable its placement within the matrix (Tables 1, 2, and 3).

To obtain a clear picture of the characteristics of each delivery mode category, this paper asks the following questions, inspired by traditional higher education teaching and learning practices:

•   How is the learning facilitated?

•   How is the content presented to the students?

•   How are the learning activities facilitated?

•   How are synchronous and asynchronous interaction among students and instructor facilitated?

•   How is an assessment of student learning conducted?

•   What are the hardware and software requirements?

•   What are the potential benefits for students and faculty?

•   What are the drawbacks for students and faculty?

The following matrix offers each delivery mode's answer to each of the questions and describes the pedagogical and technological benefits and the drawbacks of each delivery mode:

Table 1
Distributed learning taxonomy: Dimension 1 - Pedagogy

Dimension 1: Pedagogy Course Activities	Options	Face-to-face	Web-based	Portable Media	Mobile Device	Hybrid
Learning is facilitated	face-to-face	✓				✓
	online, or via Web conferencing or two-way		✓		✓	✓
	via DVD-ROM			✓		
	via mobile devices				✓	✓
Content is presented using	live lectures	✓	✓		✓	✓
	archived streamed lectures		✓	✓	✓	✓
	audio and video clips	✓	✓	✓	✓	✓
	animations	✓	✓	✓	✓	✓
	simulations	✓	✓	✓	✓	✓
	demonstrations	✓	✓	✓	✓	✓
	tutorials	✓	✓	✓	✓	✓
	self-study		✓	✓	✓	✓
	case studies	✓	✓	✓	✓	✓
Learning activities are facilitated	face-to-face with optional supplemental online interactive activities	✓	✓		✓	✓
	in a small group	✓			✓	✓
	via individual and group presentations	✓			✓	✓
	using papers, reports, projects	✓	✓	✓	✓	✓
	using self-paced activities	✓	✓	✓	✓	✓
	using discussion forums	✓	✓	✓	✓	✓
	using self-assessments	✓	✓	✓	✓	✓

Dimension 1: Pedagogy Course Activities	Options	Face-to-face	Web-based	Portable Media	Mobile Device	Hybrid
Synchronous interaction is facilitated using	face-to-face interaction	✓			✓	✓
	online office hours	✓	✓	✓	✓	✓
	instant verbal and non-verbal feedback for both remote and face-to-face students	✓				
	text feedback in online meetings or chat	✓	✓	✓	✓	✓
Asynchronous interaction is facilitated using	email	✓	✓	✓	✓	✓
	threaded discussion	✓	✓	✓	✓	✓
	Blogs	✓	✓	✓	✓	✓
	Wikis	✓	✓	✓	✓	✓
	Various Web 2.0 applications, etc.	✓	✓	✓	✓	✓
	Web searches	✓	✓	✓	✓	✓
	Research reviews	✓	✓	✓	✓	✓
Assessment is conducted using	homework	✓	✓	✓	✓	✓
(Submitted mostly face-to-face or sometimes online)	papers, projects	✓	✓	✓	✓	✓
	quizzes, exams	✓	✓	✓	✓	✓
	labs	✓	✓		✓	✓
	case studies	✓	✓		✓	✓
	presentations	✓			✓	
	portfolios	✓	✓	✓	✓	✓

At the core of this first table is the idea that delivery mode shapes both the teaching and learning processes:

From a logistical standpoint, some delivery modes (F2F and Web-based) require heavy infrastructure investments, while others (portable media and mobile devices) might require a more limited infrastructure. In this regard, a comprehensive institutional infrastructure, maintained by a strong support team, is required to enable a multi-delivery mode strategy.

Content presentation options are somewhat similar across all delivery modes, with face-to-face relaying on lecturing as a default content presentation mode. In contrast, mobile devices pose some limitations, particularly in terms of the technical restrictions posed by the narrowness of interface real estate. In addition, because of the rapid burgeoning of technology, more and more interface alternatives are likely to emerge (Kroeker 2010).

Despite the logistical issues associated with some delivery modes (e.g. portable and mobile devices), self-paced and flexible access to courses is the hallmark of most delivery modes (which offer anytime/anywhere access to archives and content).

Interaction is at the heart of distributed learning. As noted by various researchers (Moore and Kearsley 1996; Beauchamp and Kennewell 2010; Bernard, Abrami, Borokhovski, Wade, Tamim, Surkes, and Bethel 2009), interaction is distributed learning's cornerstone. All of the delivery modes provide a wide range of possibilities for interaction, and some of them offer unique features and attributes (ex. Web Conferencing). On one hand, synchronous interaction provides real-time interactivity, replicating the instant verbal and non-verbal feedback associated with face-to-face delivery. On the other hand, asynchronous interaction provides self-paced interaction opportunities conducive to larger participation and reflection, particularly with Web-based delivery modes (Chen, Wei, Wu, and Uden 2009).

Assessment options are somewhat similar across the various delivery modes. In this regard, research has often raised proctoring, plagiarism, and authentication as the most common challenges confronted when using technology-mediated delivery modes; these issues are generally raised in relation to state legislation and accreditation. To resolve these issues, several technological alternatives are being offered. These ensure authentication, enable secure proctoring, and reduce plagiarism (Roberts 2008). Recent evolutions in authentication (ex., iris authentication) and digital identity are likely to reduce some of these risks. However, it should be noted, here, that it is almost impossible to provide foolproof identity authentication, even in face-to-face assessment environments.

Table 2
Distributed learning taxonomy: Dimension 4 – Technology

Dimension 4: Technology Technology System Requirements	Options	Face-to-face	Web-based	Portable Media	Mobile Device	Hybrid
Student Hardware Requirements	Computer	✓	✓	✓	✓	✓
	High-bandwidth Internet connection	✓	✓	✓	✓	✓
	Camera		✓			✓
	Headset		✓	✓	✓	✓
	Microphone		✓	✓	✓	✓
Student Software Requirements	Basic productivity software	✓	✓	✓	✓	✓
	Specialized software (as needed)	✓	✓	✓	✓	✓
	Various Internet browser plug-ins (e.g. Flash®, QuickTime®, Adobe Reader®)	✓	✓	✓		✓
	Whiteboard and desktop sharing applications (as needed)		✓	✓		✓
	Web 2.0 applications (as needed)	✓	✓	✓	✓	✓

Hardware requirements are similar across the various delivery modes. With the exception of those courses offered in a face-to-face format and, to some extent, those offered using mobile devices, a computer with a high bandwidth connection is required. The convergence of telecommunications and hardware technologies (amplified by an increase in computing power) is reshaping most of the delivery modes, particularly with the emergence of the mobile supercomputer as the next-generation cell phone (Woh, Mahlke, Mudge, and Chakrabarti 2010). Similarly, with the exception of the face-to-face delivery mode, software requirements are almost identical across all of the delivery modes, reflecting the predominance of certain plug-ins such as Flash and QuickTime. However, the emergence of new technology standards (including HTML5, WebM, XForms, XUL, and Silverlight) is likely to reshape the delivery modes' software requirements, including the traditional need for audio/video decoding plugins such as QuickTime and Flash.

Table 3
Distributed learning taxonomy: Benefits and Drawbacks.

Benefits and Drawbacks	Options	Face-to-face	Web-based	Portable Media	Mobile Device	Hybrid
Potential Benefits for Students	Flexibility, convenience, programs offered worldwide		✓	✓	✓	✓
	Ease and self-paced access	✓	✓	✓	✓	✓
	Discussion and reflection on ideas	✓	✓		✓	✓
	Timeliness of instructor feedback during class	✓	✓	✓	✓	✓
	Face-to-face interaction / collaboration with peers during class meetings	✓				✓
	Online interaction / collaboration with peers during class meetings (Learning Management System)		✓			✓
	Multiple options for face-to-face interaction	✓	✓			✓
	Timely feedback on automated tests (Learning Management System)	✓	✓	✓	✓	✓
	Interpersonal experience and interaction with peers	✓	✓		✓	✓
	On-campus experience (extra-curricular activities)	✓				✓
	Availability of lecture archives for revision and exam preparation		✓	✓	✓	✓
Potential Drawbacks for Students	Class activities limited to in-class time	✓				
	Rigidity of scheduled time and attendance policies	✓				✓
	Geographical isolation		✓	✓	✓	✓
	Reduced access to support services and resources (administrative, advising, technical, etc.)		✓	✓	✓	✓
	Logistics of proctoring		✓	✓	✓	✓
	Delay or lag when attending synchronous session		✓			✓
	Delayed instructor feedback (exception: instant feedback during synchronous online meetings)		✓	✓	✓	✓
	Lack of visual and social cues from students		✓	✓	✓	
	Potential for lack of student motivation, commitment, and time	✓	✓	✓	✓	✓
	Potential for misunderstanding directions for assignments	✓	✓	✓	✓	✓

Benefits and Drawbacks	Options	Face-to-face	Web-based	Portable Media	Mobile Device	Hybrid
	Potential end-user technical difficulties		✓	✓	✓	✓
	Potential for being overwhelmed by the amount of information available all at once		✓	✓	✓	
Potential Benefits for Faculty	Classroom dynamic (interpersonal interaction and engagement)	✓			✓	✓
	Flexibility of time, location, and pace		✓	✓	✓	✓
	Flexible planning		✓	✓	✓	✓
	Ease of course updates, resulting in greater organization and development of content		✓	✓	✓	✓
	Long-tested pedagogical practices	✓				✓
	Synchronous interaction	✓			✓	✓
	Availability of lecture archives for potential reuse		✓	✓	✓	✓
	Availability of lecture archives for self- or external review and assessment		✓	✓	✓	✓
Potential Drawbacks for Faculty	Rigidity of schedule, high volume and frequency of communication and contact	✓	✓		✓	
	Technical requirements		✓	✓	✓	✓
	Copyright issues	✓	✓	✓	✓	✓
	Intellectual property of course content	✓	✓	✓	✓	✓
	Integrating delayed student interaction during synchronous class meetings					✓
	Need to learn to teach and to manage synchronous and asynchronous communications tools		✓	✓	✓	✓
	Logistics of interaction and communication between student and instructor as well as between student and student		✓	✓	✓	✓
	Balancing live synchronous sessions with asynchronous sessions		✓	✓	✓	✓

The consensus emerging from research is that flexibility and convenience are the key benefits ascribed to each of the technology-driven delivery modes. Indeed, self-paced and flexible access to content, a wealth of interaction and collaboration opportunities, and an advancement of scholarship of teaching are reported to be among the benefits (Larreamendy-Joerns and Leinhardt 2006; Means, et al. 2009; Castle and McGuire 2010). In contrast, isolation, lack of immediate feedback, and lack of interpersonal interaction and experience (particularly lack of campus-life experience) are cited among the drawbacks of technology-driven delivery modes (Tallent-

Runnels et al. 2006). However, many have argued that the benefits of distributed learning outweigh its drawbacks (Carr-Chellman and Duchastel 2000; Chen, Lambert, and Guidry 2010).

Delivery mode commonalities

To complete this taxonomy and to clarify this paper's earlier point about the existence of overlap and shared features among various delivery modes, it should be noted that most of the delivery modes share the following characteristics:

Audience: With the exception of the face-to-face mode, which tends to target traditional students (residential, local and commuter), technology-mediated delivery modes target non-traditional, working adult learners worldwide. This distinction is blurring progressively as local students are opting for the flexibility associated with Web-based courses.

Attendance: Because of on-campus policies, face-to-face courses require attendance; for the rest of the delivery modes, course attendance can be left to the discretion of the instructor. In contrast to the face-to-face "seat time" concept, the attendance requirement in some distance courses is being progressively reconsidered, particularly since it is perceived as an inhibitor to the flexibility associated with technology-mediated delivery modes (although attendance may remain critically important for required practica and/or for accreditation requirements).

Support for development: With the exception of face-to-face courses, all of the remaining delivery modes require extensive support for course design, production, and facilitation. Additional support is also needed for technology integration and for in-classroom operational and technical assistance. Especially because of the potential increase in faculty workload and efforts during course development and delivery, the offering of an ongoing program of faculty support and training (covering pedagogical, facilitation, and technical skills) becomes one of the cornerstones of a successful DL strategy.

Faculty profile: With the exception of a technical literacy ability rating that is slightly lower for face-to-face instructors, all of the various delivery modes require a knowledgeable, enthusiastic, engaging, caring, motivating instructor who creates a positive classroom climate; is aware of the myriad student learning styles, constraints and interests; is info-tech literate; and is visually literate.

Student profile: Most of the delivery modes require students to be self-motivated, info-tech literate, organized, disciplined, curious, engaged, and excited about learning.

Conclusion and recommendations

In summary, the taxonomy proposed in this paper provides a useful tool which should lead to a deeper understanding of various delivery modes' features and requirements. We argue that this type of understanding provides a critical decision-making tool for policy-makers, administrators, practitioners, and faculty, particularly as they aim to use these delivery modes to expand access, to improve learning outcomes, and to transform the teaching and learning landscape.

However, it must be noted that this taxonomy is contextualized within a dynamic and complex cultural and informational system that ultimately shapes its effectiveness. The many benefits of the various delivery modes can easily be undone if they are implemented without a clear roadmap for their integration and use. With this caution in mind, we reemphasize that effective integration of various delivery modes requires a holistic perspective, which articulates all of the institutional, technical, pedagogical, and logistical dimensions. The proposed taxonomy is likely to fuel the thinking of educators at institutes of higher education who are interested in integrating and implementing more technology-driven delivery modes for their courses. Consequently, we offer several key suggestions designed to advance the most effective understanding and use of this proposed taxonomy:

1. **Conduct** a thorough assessment of institutional readiness in order to understand the state of the current technical, logistical, and personnel capacity, including: 1) infrastructure capability (ex. network, bandwidth, storage, servers); 2) personnel (faculty, technical, academic and non-academic staff); and 3) organizational processes (ex. institutional and individual barriers, procedures, and workflow, from registration to course evaluation).

2. **Craft** an institutional strategy to outline the institution's distributed learning vision, strategy, and action agenda.

3. **Develop** a blueprint document which is aligned with the institutional environment and the strategic plan and which is strongly endorsed by leadership, faculty, and students. This document should clarify, among other things, the funding and the revenue distribution model (including incentives and support to both academic units and faculty for course development).

4. **Establish** partnership and articulation agreements with other institutions in order to leverage and share resources and expertise.

5. **Update** existing policies and practices to reflect the dynamic and evolving nature of the distance learning environment (considering intellectual property and copyright issues; workload, incentives, and reward structure; program/course design, approval, and revision; quality standards; and accreditation).

6. **Rethink**, renew and perhaps even change existing well-entrenched administrative and pedagogical practices. Explore open educational resources as viable alternatives to traditional textbooks.

7. **Provide** support (preferably a centralized support unit) to faculty during course design, development, offerings, and revision. Providing access to easy-to-use and well-designed course design templates and a repository of sample online courses and course activities is critical to the comfort and capability of faculty members transitioning and developing online courses.

8. **Establish/adapt** a Quality Framework (a standard rubric) that applies well-documented course production standards and ensures consistency across degree programs (and possibly unseats some faculty beliefs that online courses are inherently inferior to face-to-face courses).

9. **Provide** learners with one-stop-shop support services, including both academic (tutoring, advising, library access, technical help) and non-academic (administrative, financial aid, counseling) services.

10. **Establish** a systematic process for longitudinal data collection, particularly in assessing students' performance and satisfaction and faculty satisfaction across the various delivery modes.

11. **Establish** a research and development group to track and integrate emerging technologies, while continuing to engage faculty and students in the effective use and integration of these technologies.

In offering these recommendations, we reiterate our belief that the effective use and combination of various technology-mediated delivery modes will help institutes of higher education to expand educational opportunities to all learners and will also help those institutes to harness the power of technology to increase learners' motivation and engagement, while enhancing the provision of quality learning. However, in order to transcend the more mechanistic view of education (which focuses on the delivery of content), there is a continuing need for yet more systematic research

into understanding the ways in which the various delivery modes are shaping the cognitive, affective, and social learning experiences of students benefitting from technology-driven learning.

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About the author

Dr. M'hammed Abdous is the Assistant Vice-President for Teaching and Learning with Technology at Old Dominion University in Norfolk, Virginia. In this capacity, Dr. Abdous provides leadership and assistance to the Provost's Office and to the Distance Learning office to (1) lead (design, develop, implement, evaluate and research) distance learning and e-learning programs and solutions; and (2) to conceive, implement, and evaluate processes for effectively integrating technology into teaching and learning practices. His responsibilities include, among other things, the development of institution-wide faculty development programs and the management of online program/course production projects. Dr. Abdous' research interests include emerging technologies, learning systems, process re-engineering, and quality assurance for online courses.

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Editor's Note: Copyright and patents were intended to protect the invention or intellectual property for a time so the originator or author could receive a reasonable return for his or her work. However, changes in the law have made copyrights and patents into a commodity and ownership can be perpetuated for over a century. As a result, much valuable information is privatized and cannot be used for research or educational purposes without paying fees and incurring exorbitant costs.

New business models, like iTunes, Play Store, and You Tube, have emerged to provide low cost or free access to media and computer applications for a very large number of users. Others, like Amazon, have created a global marketplace linking more products to more buyers.

Current copyright, intellectual property, and patent laws are inconsistent with needs, options and new business models resulting from innovative technologies such as computers, networks, and copy machines. This visionary article seeks the opportunity to build and test comprehensive use of available media in an educational setting.

Documentary film and video to supplement education: the EDDFASTT project - a vision for America's future

Julie C. Perrin
USA

Education and the American dream

America is the land of invention, imagination and creativity; we've launched the space shuttle, the Internet and given birth to social networking. Almost all our children carry smart phones, post to the internet daily and may have friends that lie on the other side of town or the other side of the world that they interact with daily via computers or tablet devices. With all of this conspicuous technology, why then does America score so poorly in comparison to the rest of the world when it comes to education and overall student knowledge? Most likely it's because we have not turned our American ingenuity to the improvement of our schools and the support of our teaching professionals for too many years. We're failed to apply our technical achievements where they can make the most difference and we need to adjust our collective thinking with regard to what constitutes an 'adequate' educational experience.

America's educational system is in trouble. Each year fewer students are graduating with the knowledge and skills they need to enter and succeed in a college or university environment. Teachers suffer from a lack of respect both in and out of the class room. They are being forced to compete against iPods, Game Boy's and smart phones for our children's attention. School districts and principals are cheating on standardized tests designed to measure our children's progress to get the funds needed to keep their schools running. Their survival is tied to the results of these often misinterpreted and disappointingly limited standardized tests. In a world where sound bites and instant gratification are the status quo, the American people need to step up and plan a better future for our families and our country. More than ever before, we need to address the educational needs of the children of America because their educational success is fundamental for the continued strength of our nation and its success in the new global economy.

Recognizing the styles of learning

As an older student returning to college to complete the degree I did not pursue in my 20's, I was stunned to find that classes had not changed much since my departure from High School. The text books were still thick and very few were well written. They did not convey the information they contained in an engaging manner. Though the classrooms were now outfitted with at least a computer, DD/CR player, overhead projector and screen, many lectures were now an endless progression of power point slides with students scrambling to copy the information into their

notebooks before the instructor changed screens. The material was mostly greeted with apathy, and attendance was poor. But then there was Rachel.

Rachel Messenger, a Biological Anthropology professor at Moorpark Community College in California, began her first lecture, not by reading the syllabus line by line and warning about the penalties of cheating, but by describing the three learning styles to her students. She spoke about auditory, visual and tactile learners and explained steps she had taken to design her curriculum to deliver the material in a diversified format that would give students in each learning category the best chance to absorb and retain the information. It was impressive to find that the understanding of human learning had progressed to that level but also confusing because, in spite of having developed broader understanding of learning styles and teaching techniques, the graduation and literacy rates in many American schools continue to decline.

Thanks to the internet, today's students, teachers and parents are able to complete a simple, free assessment

1. To determine the students' individual learning style. There is a dearth of information available to help each type of learner increase their understanding and retention of classroom materials
2. It's a great tool but, for the most part, one that is ignored. Because of the punishing economic environment most schools and parents are forced to fight just to provide the day to day necessities for their children.

The current reality is that single parent families are severely handicapped and those with two find that usually both parents have to work and even then by the end of the day it is difficult to get the basics of meals and homework completed before bed. It's not that parents don't care; modern families come in many shapes and sizes and priorities rarely include proactive research on learning techniques. Post-recession, many parents are underemployed, searching for work, or working several low paying jobs to maintain their households.

Inside the classroom environment many teachers don't fare much better. While they may seek to enrich the lesson content for their students, often it must come at their own personal expense. Schools have few avenues available to provide enrichment content; even simple items such as extra paper, pencils or basic art supplies are frequently purchased by devoted teachers out of their own salaries to complete the learning environment. Videos or interactive games are too expensive for the average teacher to procure and, with constant funding cutbacks to the educational system; the situation is becoming worse. Even though research has established that identifying and adjusting course work to a child's specific learning style can boost results on standardized tests, the system is not capable, in the current environment, of moving to incorporate materials and technologies that incorporate this information into the curriculum. This leaves many students floundering and their parents and teachers frustrated.

Change has always been difficult but many dedicated educators are willing to embrace new tools if they can get them. Adjusting curriculum to accommodate learning styles can help them to support students to achieve in ways they never expected and create an improved educational experience for millions every year. Ultimately these changes will show themselves in the all-important test scores, the pseudo, one-size-should-NOT-fit-all bar by which success in education is currently measured.

More importantly, the newer curriculum and learning materials are more in line with the twenty-first century learning goals that need to be embraced to improve learning and performance at all levels of education.

Educational resources and the television connection

Even at the inception of Television broadcasting there was a belief that it would be a medium for providing education to the American public. The Public Broadcasting Act of 19673 was passed by Congress to offer resources and opportunities for educational broadcasting. The most popular and longest running program that came out of this is, of course, Sesame Street. Puppet characters such as Bert, Ernie and the newer and more popular Elmo have sung and danced through the last 40 years teaching American pre-school children numbers, letters, and, interestingly enough, tolerance.

In the late 1970's the ABC Network launched a series of musical, animated shorts collectively called Schoolhouse Rocks that addressed more in depth concepts such as parts of speech, branches of government and mathematics. These shorts aired on the major network between cartoon programs on Saturday morning's and left a generation of children singing under their breath during tests as they recalled the information that had been quietly slipped to them between episodes of Scooby Doo and Super Friends. This easily digestible information disappeared in the mid 1980's but was revived for the video and DD markets in the 1990's because the people that had been exposed to these programs as children remembered how helpful it had been to them when they were tackling the concepts. The demand from parents revived the series briefly proving that the market can and will respond to the possibility of educational dollars looking to be spent, even from a limited private sector.

In the early 1980's there was an evolution of the Schoolhouse Rocks concept into the arena of prime time Television. Anson Williams, playing a character named Potsie Weber on the popular sitcom Happy Days, learned the circulatory system using a song, "Pump Your Blood". The information is still relevant as evidenced by the fact that one version of the clip, now some 30 years old, has been viewed almost 150,000 times on YouTube by students struggling to learn.4 More recently, the Disney channel show Hanna Montana, featured the lead character learning the skeletal bones through a similar musical method. This clip has commanded 17,391,464 views as of this date.[5] Why then are we not importing materials like these into the classroom to broaden the educational arena and maintain the interest of our new, digital age students? Sadly, because there are not enough of these types of musically based clips available to teachers and because many classrooms are not yet equipped to use them. Many schools do not have adequate internet connections or display devices in the classrooms where the teachers need them. Fortunately, this is changing rapidly as school districts across America have begun to install high speed internet access to campuses so that computers in the majority of middle and high school classrooms have this necessary access to new, web based digital resources.

The launch of The Discovery Channel to a limited base of 156,000 households in 1985 brought the concept of marketable educational programming in to the private sector. Within five years the cable network was viewed in over 50 million households, launched programming internationally, and gave rise to a number of more specialized channels such as The Science Channel, Animal Planet, Discovery Kids and Discovery Ciilization.6 In 1995 the Arts & Entertainment Network expanded its entertainment channel choices to include more educationally based programming via vehicles like The History Channel, The Biography Channel, and History International7 as well as others.8 National Geographic Corporation transposed the success of their full color, educational and anthropologically based magazine to the Television documentary format via their NatGeo and NatGeo Wild channels9 proving without a doubt that smart programming can sell advertising. Viewership for these 'Smart Channels' continues to thrive. This should have guaranteed the flow of new and better programs to document adjustments in understanding of the fundamentals and concepts within the fields of geology, astronomy, and even physics without losing their ability to provide a fresh understanding of historical sites, characters, ancient literature, political structures, even biblical and secular interpretations of archaeology. It was

expected that there would be no shortage of quality, educationally significant programming available but in recent years these channels have begun to embrace a 'reality T' style of program to maintain their viewership, much to the disappointment of a quiet majority of their viewers.

David Cheetham, PhD. is an anthropologist that participated in a History Channel program entitled Chasing Mummies which aired on the network in 201010. Dr. Cheetham spent six months in Egypt assisting Dr. Zahi Hawass in the Recovery, documentation and administration of a vast array of antiquities. They visited an endless succession of sites including The Giza Pyramids, The Valley of the Kings and The Falcon Galleries and others during which they were filmed by the enthusiastic crew almost every waking moment. Speaking with Dr. Cheetham in early 2013 I was told:

> "We [Dr. Hawass and Dr. Cheetham] had these great conversations about the artifacts we were working with and the locations we were visiting. It was amazing. I was really excited about doing the project when I saw what they were actually using… I couldn't believe it. They filmed so much great material and almost all of it all ended up on the floor."11

Dr. Cheetham is not alone in his disillusionment. Dr. Kara Cooney, an Egyptologist and coffin expert who has been featured in several productions on Egyptian royalty and even completed six episodes of her own show, Out of Egypt, for the Discovery Channel. She has become guarded about working on the big network productions.

> "If you're not careful, what comes out of editing at the end can be construed very differently than what you thought you were communicating. It's hard because you want to share your knowledge, but you don't want something that could be misinterpreted going out because it could really hurt you professionally."12

The recent trends in programming are disturbing but after more than 25 years of output, there is still a vast stockpile of information available on a huge variety of subjects that is not used or under-utilized by the American educational system. If we don't begin to apply these resources effectively, it gains us nothing. Additionally, if public demand can be focused to show the industry that these fact based programs are still lucrative it should boost the production of new material and give the existing material new value in the market. This will ideally cause the networks to sponsor those that are interested in producing more much needed and factually accurate programming.

America challenged is an opportunity for education

During the recent recession millions of Americans lost their jobs. Since 2009, long term unemployment rates hovered around 9.5% nationally[13] and are significantly higher in states, like California. Many Americans have been out of work so long they no longer appear in the statistics because they are no longer eligible for Unemployment benefits. Many have given up trying to find work.

The 1990's brought the adaptation of the NAFTA (Free Trade) agreement[14]. Because of this opening of trade borders between the US and Canada and the US and Mexico, the manufacturers of many American products relocated to cheaper labor markets south of the boarder and, within a few years, transitioned to even less expensive labor markets overseas. This shift left the America with little to no industrial or manufacturing with jobs for workers displaced when the housing bubble burst in 2008. Furthermore, the shrinking economy left a cross section of unemployed workers with skills ranging from manual labor, to administration, to computer and technical engineers. Many people with diverse and useful skills are still waiting for their chance to return to full time employment.

Educators, including many teachers, have also been laid off but not yet in the numbers that these other industries have suffered. Since there are not going to be appreciably fewer children needing education in the future, most teaching professionals have managed to maintain their employment, however, many of the support personnel for America's teachers have been laid off, leaving teachers struggling to provide an adequate education to the millions of children who will create America's future. The possibility that the future of this nation could end up being controlled by a very few individuals who were capable of purchasing their education outside of the current American Public School System suggests that the future of America could be less about the needs of the average citizen and more about the decisions of an elite that is insensitive or unable to comprehend the needs of the masses. This is an unacceptable outcome for a country that was founded on the belief that every person has the opportunity to excel and achieve his or her dreams through hard work and ethical behavior.

America is technically out of the recession but is failing to thrive. Housing markets are still down, unemployment is high, and, though interest rates are historically low, business is not investing in labor or capital, keeping job availability low. June of 2011 saw the creation of only 18,000 permanent jobs nationally.15 People who are unemployed or underemployed are not able to spend enough money to stimulate the necessary economic growth. America needs a new industry as much as the children of America need new and better learning tools for the future. EDDFAST can create much needed jobs nationally, spur the upgrade of technical infrastructure and improve education. The time has come to create and implement this proactive program.

Bringing education and jobs together

Currently Americans have a multitude of entertainment options. Overall the internet provides the most choices and easiest delivery. Social networking, online multiplayer games and even video are all readily accessible through broadband. YouTube has a plethora of low quality, educationally based clips and even some higher quality classroom material that gets a surprising amount of traffic as independent and more technically say teachers attempt to get more and better material for their classrooms. Documentary programming is available via Netflix in either the instant streaming format or the slower, DD via mail option. The main problems with educators accessing additional information for the classroom in these formats are:

- **Quality** – Much of the YouTube video is grainy or second to third generation analog signal transferred to a video format and further degraded by the digital signal attempting to encode the noise present on the clip.
- **Length** – Much of the media is either too long, as in an entire 30-60 minutes of video, or too short, 30 seconds of animation found on a website that, unsupported by context, fails to adequately cover the material that the educator is trying to present, but is better than nothing.
- **Practicality of Use** – Spending hours to locate material that may be inadequate or overly voluminous among sources that are less than the best quality is not a good use of our educators' valuable time. There are, however, other options available in this brae, new digital age. The solution currently exists piecemeal, but can be brought together relatively easily to create a powerful tool that can bring the education of American children to a much higher level. It does require a new industry of people to expand the curriculum standards and to view, index, catalog existing media resources. It will require technicians and engineers to develop and maintain the digital, internet based multimedia database for America's teachers and students.

Educational Documentary Database for the Adancement of Students Through Technology (EDDFASTT)16

In the midst of the current technology, the creation of a searchable multimedia database is a relatively simple proposition. However, it must be achieved with care and insight so that the materials are cataloged correctly and accessible in the formats that curriculum designers, teachers, and students will need for successful learning.

Most colleges and universities already subscribe to text based databases that allow the faculty and students to view newspaper and magazine articles, encyclopedia and other reference books, as well as a limited catalog of video and still pictures. Text searches are simple because the subject word is already present in the material and all the search engine needs to do is to match the text. Existing video materials would need to be viewed, have index markers added and the information on those markers encoded to the searchable index so that specific topics could be easily found. The process is not difficult, but it is time consuming and would require a large labor force to complete the processing of the existing seventy plus years of visual material before the centennial of Television's creation. New materials could be pre-coded for the system much like media is now captioned. Simple editing techniques, such as blank frames between topics, would also aid the teachers in retrieving segments for classroom use.

In addition to the initial 'assembly line' of workers that would be viewing and cataloging video information, there is a need to revive the position of digital assistants/librarians for the educators. Many school districts have done away with their media or film librarians, crippling the educators that relied on these materials and services.

"Our media librarian was great!" I was told during a conversation with my daughter's seventh grade science teacher, Barbara Robinson. "She knew exactly what materials each teacher used most and if there was something new we wanted, all you needed to do was describe what you wanted to show and she could walk right to the shelf, and put what you needed in your hand right then. When the district dissolved her position (as part of budget cuts) she was forced to retire. Before leaving she did her best to send the films to the schools that had made the most requests for the specific material but unfortunately, there was usually only one copy of a resource. Now no school has access to all of the materials.

"Our school has nothing on meiosis or nutrition and a lot of the material that we received isn't grade appropriate. I know she did her best, but now what we were given then is all we've got to work with. We haven't been able to purchase anything new in years."[17]

Resupplying the educational system with these much needed materials and services would make a huge difference in the quality of the American educational system. Initially they would aid teachers and students as they learn to access the database and retrieve the information necessary to enhance the teaching of the material in the classroom. They could also adjust or compile the applicable video material to fit within the time segments that the educators require because most of the time there is no need to view an entire production. Often the material that would teach the concept to students is as short as one to two minutes. For example, when teaching the theory of plate tectonics there may be several segments of 2-4 minutes that are applicable to the subject and show exactly what is so difficult to explain through reading or lecturing. The digital assistant/librarian could identify and isolate the most applicable clip, present it to the teacher for approval and then deliver this 'Educational Edit' to the teacher for use in the classroom. These segments could then be added back to the database with indexing as to what subject they were used to teach in conjunction with what textbook was used, the grade level of the students, and teacher rating or notes as to the effectiveness of the clip. This would help to identify and expand the accessibility to the most useful materials and help educators locate what they really wanted more quickly in the future.

These librarians and assistants would be supported by the programmers, engineers and technicians programming the interface that would house the data and connect it to the internet. Several mirrored sites would create both redundancy and rapid accessibility. This is not new technology. Streaming channels such as Netflix, YouTube, Hulu and Amazon Instant video provide digital video on demand every day to satisfied consumers. The necessary element that would need to be added would be a simple interface to mark the beginning and end of the desired segment so that only the needed portion of the program would be retrieved. This would help to lower bandwidth, storage space on the educator side and reduce general overhead costs for the users.

American educators will gain a valuable tool that will allow them to better educate the nation's children, building a stronger future for us all. The benefits of a program like this to the children in a society rife with visual and auditory stimulation should not be underestimated.

Support for the networks that provide material to EDDFAST

It is important that the networks be acknowledged for their years of support for education and the documentary film industry. The EDDFAST program could provide additional revenue to the participating networks through an expansion of viewership that would ultimately result in an increase to the value of the advertising slots available during key programming hours. Though recent changes in legislation have adjusted many of the regulations for the educational use of copyrighted materials, it is more productive to provide networks with tangible benefits to reinforce the marketability of their first run documentary programming. A simple process, provided through the EDDFASTT website could promote first run, home based viewing with the intent of broadening classroom learning and the documentary industry would also benefit from the increase in demand for, and consequently the revenues from, new materials by employing the following system:

When educators access the EDDFASTT website and search for a specific subject, a side bar notice would display information advising them of the future air dates of programs with similar content and a short synopsis of the material included in those programs. The educator could then register for any of these 'on air' programs by choosing the appropriate option from the information bar and adding their name, school name, student grade level, email and the number of students in their class which would then generate a code that the educator could distribute to the class via email or on the class assignment page on their school website. The students would then have the option of viewing the program on the air date and then accessing the network's website with their class code to take a short, multiple choice and/or true/false quiz. The results would be automatically compiled by the website to a spreadsheet that would email itself to the teacher within 72 hours of the programs air date. This simple and easily programmable system would accomplish several things:

1. It would create an opportunity for the students to absorb additional material in an enjoyable manner outside of the classroom.
2. Give the students and teachers an easy option for homework credit or extra credit towards their grade for the course.
3. Provide the network supplying the material with a real and tangible assessment tool to track the increase in viewership for their programs AND
4. Highlight the types of materials that are most sought after by educators so that additional programming can be made available or created thereby continuing to increase the value of the network and their programming to this new market.

This also has the potential to increase the parental 'buy in' to the educational process as families would have the option of watching the materials together, offering the opportunity for time

stressed parents to participate in the learning process, see what their child was studying at school and potentially develop a better relationship with the teachers that are educating their children.

Options for priate industry in the EDDFASTT program

There should be no doubt as to the power of industry in the United States. Millions of cell phones, laptops and tablets are sold annually. Most university courses employ downloadable PDF files along with or instead of a required textbook. These advances give unparalleled access to more and more current materials than ever before.

Apple's release of the iPhone and the iPad pushed the market in new and exciting ways. It then created a temporary hold by contracting the iPhone to one cellular carrier for 2 years. While many grumbled about the inability to obtain and utilize the features of the new product on their cellular carriers' network, AT&T invested billions in the infrastructure to support the Apple devices. Exclusive rights to the sale of the product that they had created the network for was a way for them to recover their initial investment in this new and upgraded technology. Now there are a host of mobile phones available that include features like applications to view and edit documents, images and videos that originated with the iPhone. Documents, Facetime video chat and instant photography and video are now available to broad segments of the population and younger and younger audiences.

Current tablet technology is basically a consumer product; you can access many things like music, games and videos on your deice but it lacks the ability to create and edit in meaningful ways. Many devices are moving to cloud based options and the industry is expanding robustly offering more and more options for business professionals and students to complete their work. The 'iPad Warrior' is a person that has developed ways of completing all of the business tasks from one of these lightweight but increasingly powerful devices and more and more Americans are joining the ranks every day.

Tablet computing devices are an excellent fit for the EDDFASTT program. They are easy to use. Touch screen devices can average under a pound but can access and house ritually unlimited amounts of data via the internet. A tablet technology including a basic editing interface and cloud based account system could give an educator the option of preparing a clip and then either downloading it to create an embedded file within a presentation applications, such as power point, or keeping an on-line file cabinet that could be accessed on the fly as the teaching situation demanded.

The technology required for this type of an implementation of tablet computers is available but, because the market has not required it, the programming and design of the EDDFASTT compliant tablet and editing suite has not been created. It would seem both feasible and appropriate to implement a similar, time sensitive, exclusivity contract with entities in private industry willing to invest in the EDDFASTT program by developing the necessary hardware and software to facilitate the implementation and use of the database materials both at the serer site and at the user level. Further, quality design and limiting of initial hardware and software will give rise to a new push for the American technical industry as additional endorse and manufacturers seek to improve the initial system. As evidenced by the growth in the cellular and computer industries, this type of competition has been a strong contributor to the growth of the American economy and again, jobs created in these sectors would help to employ thousands of people.

Financial support of the EDDFASTT project

The program could be initially funded by government grants for education and public Television, private educational endowment funds, and interested private industry. Eventually nominal

subscription revenues could aid in maintaining program quality. Many of the segments of the EDDFASTT program, such as content and parts of the technical framework, would be self-sustaining. Additional funds could be acquired through the funds that are already earmarked for public education programs.

It should be understood that school districts are already cancelling their textbook budgets and investing in tablet technology.18 Educators are crying out for digital resources and multimedia content as quickly as it can be delivered. EDDFASTT technology can be partnered with other resources to integrate into a more vibrant teaching environment and eliminate utilizing dated materials. Because of the national and public nature of the program, EDDFASTT would of necessity be a public entity with strict salary caps for administrative positions and realistic wages and benefits for general staff. Bureaucracy would need to be streamlined to avoid the crippling sea of red tape that has rendered so many of our country's government backed programs ineffective.

The role for uniersities and colleges in EDDFASTT development

Upper level educational systems will be vital in the creation of content for the EDDFASTT program. Many universities have begun to develop visual Anthropology programs or have existing Multimedia/Film/Television Schools as well as strong Anthropology departments. These resources can be encouraged to create new, ethnographic and documentary materials for EDDFASTT use as well as provide real world experience for participants. Many students are already engaged in filming with the video available on their cellular devices or with actual hand held video equipment. Taking this to the next level for many of the current students would not be unreasonable and can bring them valuable skill sets for all types of twenty-first century jobs from office work to marketing to documentation for hard and soft sciences.

In a sample program, the visual Anthropology Department (or a similar division created for this specific purpose) would hold quarterly meetings, some to inform students of the program. This would be done at the end of the quarter when interested students would have an opportunity to view the outstanding submissions from the current session. Other meetings, held during the first week of the new quarter, would help to introduce students interested in joining the program to each other. Students could access documentation via the department website to help them focus their ideas and then they could use the meeting to 'advertise' to each other about topics or ideas about which they would like to develop a short (maximum 10 minute) film.

The newly formed teams would then complete initial paperwork with department staff that was appropriately credentialed and employed by the department to facilitate the creation of these student project films. They would help the student team to develop an independent study/research contract regarding their goals for the project, help to arrange review of the research and factuality of their projects content, and then monitor the students' progress and assess the final work. These projects could be either for a letter grade or for course credit.

Films that are exceptional could be displayed on the institutions YouTube page and the best entries could be entered into national competitions where the students could be rewarded with educational grants, scholarships and/or internships with professional organizations engaged in making Television or cinematic content.

Additionally, a university environment provides students access to many different disciplines. While archaeology and anthropology subjects come easily to mind, astronomy, paleontology, botany, physics, engineering, medicine, practically any course material could be utilized by students as project topics. Art students would be very useful in projects to provide concept drawings of things that are not available and computer, multimedia, and engineering students could provide animated sequences or CAD drawings to help illustrate concepts. Another benefit

of university involvement is the frequent research projects and field work that is being performed by faculty. Students in the field can work together and learn not only the field discipline necessary for the completion of their specialty but also new and diverse ways of documentation and presentation of their research. These student productions would provide necessary real world technical, research and writing experience for the participants in their field of science as well as offer them an opportunity to make valuable connections for their future careers.

The University channels will ultimately provide additional content for the EDDFASTT program from a student's perspective that may help to bridge the gap that currently exists between knowledge and understandability. Though odiously still in its infancy, the EDDFASTT program offers huge potential for both industry and education.

The role of social media in EDDFASTT

Since it will take some time to obtain funding for the backbone equipment and programming required to support the national implementation of EDDFASTT, social media is an excellent option for creating program awareness. The immediate access to EDDFASTT content through the university involvement, as detailed above, would create an excellent flagship for the project as well as provide important contributions to the long term success of the system. The sooner we begin, the more students will benefit so it is of utmost importance to use any method available to take this program forward.

The role of social media in any aspect of society, not just nationally but internationally, should not be underestimated. In recent years, we have seen Facebook, Twitter and YouTube reshape the way people interact with each other. Pictures, video and tweets go 'viral' and in times of social crisis they have proved to be a unifying and motivating force in events that have changed the world. In recent years social media has created an outlet for national sorrow over the deaths of innocents and been a unifying force for numerous social platforms in the United States. Egyptians coordinated a change in administration through social media.

Millions of people log onto social media daily and even multiple times per day. The evening news refers to social media sources to get a sense of what the public thinks on everything from elections to celebrity mishaps. The power of this medium to affect us as we go about our daily lives is truly staggering. Within this daily maelstrom there is a great opportunity for the EDDFASTT program and particularly the tie between the approved university YouTube channels and other outlets. Many people post interesting or informative videos from YouTube to the other social networks and the chances of having EDDFASTT program student submissions go viral through this medium is very good, in fact, it should be encouraged. The more views that can be generated for the program ia social media, the better the chances of growing the program and providing educators with more tools for their classrooms. Feedback from educators on specific segments can help other teachers locate the materials that they need for their classrooms and give valuable feedback on necessary content and market indicators for the network programming. This will help to bring the program into a sphere where widespread public support for educational improvements can be achieved.

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Julie C. Perrin is a Microsoft Certified Systems Engineer with degrees in Computer Networks, Systems Engineering and Anthropology. Ms. Perrin worked with technology for over 15 years creating technology solutions for small businesses to enable them to compete with larger entities.

Julie recently graduated with a Bachelor's degree from the University of California at Los Angeles (UCLA) and has been admitted to the Master's program in Visual Anthropology at the University of Southern California (USC). Her studies will include a documentary that will explain and test the university implementation of EDDFASTT.