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ABSTRACT

This paper focuses on the design of an assessment plan that can accurately measure the impact of using World Wide Web-based deliveries to increase performance. Key trends in technology and training are reviewed, and effective assessment of online training deliveries is examined. The Virtual Business Training Center (VBTC) is an integrated business resource center that provides students with access to online market research, project management, and other project-based data analysis opportunities. It also functions as a business lab and virtual training for business partners. The authors used this unique virtual project environment to facilitate the access of project data by students (retrieval, analysis, evaluation), re-post as work in progress onto a Web-based environment for business partners' participation, then edit or move onto the next project phase. Current research results indicate that the Web-based environment enhances access to both volume and timeliness of data and information. This virtual training platform also speeds up analysis and contributes to more effective project completion. The contribution to project success was measured by adherence to schedule, agreed-upon deliverables, and resource allocation. (Contains 14 references.) (MES)

Research Findings on a Virtual Training Center – Measuring Web Based Training as an Effective Project Management Facilitation Intervention.

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Abstract: The Virtual Business Training Center (VBTC) is an integrated business resource center that provides students with access to online market research, project management, and other project-based data analysis opportunities. It also functions as a business lab and virtual training for business partners. We use this unique virtual project environment to facilitate the access of project data by students (retrieval, analysis, then evaluation), re-post as Work in Progress onto web-based environment for business partner's participation, then edit or move on to the next project phase. Our current research results indicate that the web-based environment enhances access to both volume and timeliness of data and information. This virtual training platform also speeds up analysis, and contributes to more effective project completion. The contribution to project success was measured by adherence to schedule, to agreed-upon deliverables, and to resource allocation.

Introduction

A key online business relationship exists when an organization, facilitator, and learner interact within a technology platform to develop workplace performance. These technology tools can help learners (both students and employees) target and reach their highest performance objectives quickly and with reduced trainer support. In project based classes there are exciting opportunities for problem solving to be facilitated by advanced and interactive technology interventions. New knowledge can be gained by exploring unique applications of technology platforms that facilitate project deliveries. Preliminary results indicate an increase in interaction and access (participation) of data usage, analysis of data, and facilitation work by nearly three-fold compared to traditional face-to-face project environments. Our study also reflects the number of interactions between team members and the facilitator increasing on average from 22 to 48 contacts in the web-based environment. Quality gains have been observed including an increase of at least 25% of required deliverables completed. Total project completion to schedule increased from 0% on time completion in traditional project delivery to 80% using the web-based environment. A summary of the baseline and web-based intervention environments are included in Research Design section under Background subheading of this paper. A developmental assessment effort can be used to study existing online web-based intervention platforms and their effectiveness in facilitating a project-based delivery. The focus of this paper is on the design of an assessment plan that can accurately measure the impact of using web-based deliveries to increase performance. The full discovery of this relationship requires a quick review of key trends in technology and training and then a full examination of effective assessment of online training deliveries.

Growth Trends in Technology Based Training and Instruction

There has been a tremendous explosion in the types and use of technology to deliver workplace and learning education objectives. Each technology platform has seen growth with the web-based training platforms growing fastest. Some important growth trends are highlighted by the following American Society for Training and

Development (ASTD) 1999 statistics; 30% of all training delivery types are technology deliveries, only 3% are high end interactive (EPSS) technology deliveries, the use of multimedia has risen from 12% to 22% the last two years (up to 81% with companies with progressive training strategies – designated as benchmark companies), British Open University and University of Phoenix alone has grown from 10,000 online students in 1990 to over 50,000 in 1998 (ASTD 1999), and projected growth of technology based delivery for training for 2002 is 55% an increase of 25% from 1999 (Salopek 1999).

Assessment Trends in Training and Education

There is a glaring disparity when you observe the rise of inclusion of technology in training/education while there exists a relatively low measurement of its effectiveness. The following statistics highlight some recent trends; 94% of surveyed companies assess training at Level 1 assessment which reflects no increase from 1996, 53% of surveyed companies assess training at Level 2 assessment, 29% increase from 1996, 32% of surveyed companies assess training at Level 3 assessment, 19% increase from 1996, 28% of surveyed companies assess at Level 4 assessment, 25% increase form 1996, output data collected (number of people receiving training, number of training offerings, \$ spent on training, etc.) consistently lags behind input data collected (productivity, customer satisfaction, return on investment, sales, waste reduction, etc.) by 20% in almost every category, 94% of survey companies use questionnaires to assess, a low of 40% use performance records (ASTD 1997).

Assessment Challenges

The technology is used as a set of intervention tools to develop significant performance improvements. International Data Corporation's Research Manager Ellen Julian expresses the challenges as a maturation of Information Technology (IT) infrastructures that can now accommodate web based training, high interest among companies to pilot online learning systems, and an increasing pool of knowledge to implement those technologies. As an example she cites the recent acceptance and use of state of the art online chat to facilitate online training and now it is already jumped to implementing live, real time video conferencing and collaboration over the Internet (Julian 1998). The following items outline the key challenges that educators and trainers face when integrating online technologies into their delivery systems: technology developments occur faster than adoption, technology adoption occurs faster than assessment, and the most immediate evaluation challenges in business and education involve focus on expertise and commitment

New Knowledge Requirements

New Knowledge is where many training facilitators and university faculty must pause and consider their actions. Are the online interventions being used effective? Do the online interventions improve performance areas targeted? Are the online interventions more effective for the majority of the learners? Can learning using online interventions be measured? Can application of learning be measured? Other questions can and should be addressed as innovative online technology tools continue to be introduced and requirements for employee performance development increases. The burden at this point is obviously shifting from what can be done using online technology platforms to which ones work and where are they best applied. Unfortunately this is a forgotten task of trainers and faculty, we plan and do and then plan and do again without gaining key knowledge of the effectiveness of our techniques or tools. Assessment represents the set of activities that moves from doing (implementing a new online component such as video conferencing) to studying the doing action and determining whether the intervention actually made an improvement in learning or application. If we have quantitative and qualitative based knowledge in a particular online intervention that did or did not improve learning or application then we have new knowledge – assessment's ultimate goal. The process for effective gain of this new knowledge includes four steps.

Planning an online intervention – This step is not an arbitrary action guided by what technology is available or most innovative but rather a structured and focused plan. After initial defining activities selection of a subsystem to improve takes place, the improvement effort exposes identifiable skills or knowledge gaps, and then a baseline needs to be taken. What level of skills do learners possess right now? What is the level of performance exhibited currently? What is the level of satisfaction that customers of this subsystem express? What is the current training intervention used to improve these areas (classroom deliveries, CBT, etc)? This balanced measure baseline will provide data that can be used later to determine whether a new and innovative online technology training intervention has actually made an improvement in skill and knowledge application and whether that improvement has had an impact on exhibited performance, customer satisfaction, and competitive position. The gap between the

existing performance and desired performance is the next piece of the plan to be examined. These planning activities include identification of all the interferences between the existing performance and the desired performance. Finding the most significant interference prepares us for the next stage of a new knowledge quest.

Implementing an online intervention – Immediately after planning the training focus area that requires performance improvement selection of an appropriate online intervention is considered. The elimination of the significant interference becomes the criteria for selection of which online intervention will be best to try. At this point a match of needs, expertise and availability of technology can be maximized. A small intervention change should always be attempted first before major investments are taken and because we do not yet have knowledge of the effectiveness of the technology intervention.

Assessing the technology intervention – Quantitative and qualitative examination of the intervention as it compares to the baseline. The design, collection, analysis, and evaluation of the data results will determine whether the online technology training intervention had the desired impact, did it work?

Standardize the use of the online intervention – this step may also include the abandonment of technology interventions that do not make improvements in learning and application. Increasing retention of information that does not increase student/employee performance is not improvement and should not be used to determine technology intervention effectiveness. If an online technology intervention has been documented to improve a training output (learning and application) then the improved training intervention should be standardized. The new technology intervention should be implemented on a larger scale than the pilot. It can be used to deliver other knowledge or skills area needs (i.e. sales to software instruction) or used for all learners in a particular skill area.

Framing the Assessment

Assessment Problem Component 1 – Exhibiting Business Knowledge and Technology Skills

The project based approach is a technique, pedagogy, and delivery of business info into university and training environments and an integral piece of improving the effective training of future business leaders. Project work in general provides an environment where learners exhibit a direct, hands-on application of business skills, knowledge and attitudes. Learners have the opportunity in this environment to develop key business skills that are difficult to deliver in the traditional classroom format. The project based approach functions as a “pull” system, much like successful and innovative production control systems that require parts to be delivered only as they are needed using a Just in Time (JIT) system. Pulling the business content requirement and technical skills into the project/classroom at exactly the time learners need those enablers optimizes the benefits of experiential learning project work. It also increases the range of applications of various business skills. The question of what type of enabler (skill intervention) is needed is matched with what best enables the successful completion of the project component. The project also is the significant criteria for what should be introduced (knowledge intervention) as preparation. The timing of the required training intervention is determined by the immediate needs of the project team in resolving project problems. A comprehensive project based program will require the understanding and usage of relevant knowledge and expertise. The real time nature of projects should eliminate the expended time lag between the receipt of theoretical information and its implementation in solving problems.

Key training highlights of this Just in Time / Pull approach include; less Work In Progress – stockpiling information eliminated, quick response to problems – completion of projects require skill and knowledge gaps to be addressed immediately before progressing further, better quality – duplication of skill, knowledge, and attitudes is known and avoided by students and faculty (do it right the first time), better market response – actual business projects are as dynamic as business environment, student confidence – building cycles of success, supports practice, increases level of participation, develops levels of leadership and teamwork.

The Pull system approach - delivery and pedagogy highlights for faculty and students include; opportunities to test and refine change and improvement theories, requires exhibited knowledge, raises awareness level of business success and potential, raises awareness level of team success, raises awareness level of professional and personal success, presents challenges requiring more than one set of skills or knowledge bases, requires depth and of content and application expertise, team centered, problem solving emphasis, learn how to learn emphasis/self directed learning

Assessment Problem Component 2 – Making Projects Work

A comprehensive project-based approach puts tremendous pressure on the use of project management skill of both learners and facilitators. In addition, the pull system success is directly hinged to successful project completion. Unsuccessful project completion compares to covering 7 of 22 chapters in a textbook based course, the textbook range is the basis for required body of knowledge. A completed project meets the body of knowledge requirement for project-based approaches. With this in mind, executing the project effectively and efficiently is paramount to learning and success. Our recent work with technology platforms specifically focuses on more effective project management. An innovative use of online technologies is not just an alternative to be used in project based business classes, it is a better platform. An online platform in a training setting will increase participation of learners, provide more opportunities for critical thinking, enhance communication between team members, enhance communication between business sponsor/faculty facilitator/student team, increase probability of achieving required deliverables, quicker responses to faculty interventions, project closer to planned timeline schedule, more communication between team members, clearer exhibition to business skills and knowledge, more cohesive group work, project completion closer to planned specifications, earlier interaction with facilitator/faculty, earlier interaction with business sponsor, and greater number of outside experts involved with project.

Research Project Description

This applied research project will focus on examining solutions to practical problems experienced in project based classroom deliveries. This Type I Developmental Research will emphasize the study of a specific online technology platform and its use and will produce a research output that articulates lessons learned from analyzing this online technology platform in use to facilitate business projects in the workplace and college environments.

Research Questions

Can online platform improve access (increased volume – quantitative) to resources (information, data, team members, etc.)? Can online platform improve interaction (increased effectiveness – qualitative) with and among resources (team members, facilitator, sponsors, data analysis, etc.)? Can improved access and interaction through online platform improve project management success?

Are students (more?) satisfied with use of online technology to facilitate team project activities? Are students (more?) satisfied with the results of online technology toward project completion? Are students (more?) satisfied with online technology as a learning environment? Is faculty more satisfied with student participation and demonstrated expertise?

Assessment/Research Hypothesis

Can a high end and interactive online training environment enhance access and interaction of team member activities and improve project completion?

Project Statement

To improve the high end interactive online training environment as measured by frequency of access and interaction and successful project completion.

Operational Definitions for Project Statement/Hypothesis

- Access
 1. Information – schedule, work in progress, problems, questions
 2. Expertise – technical, analysis, project management
 3. Software applications – spreadsheets, scheduling, statistical analysis, etc.
 4. Planning – with sponsors, team, facilitator
- Interaction (textual or interactive multimedia using technology tools from remote locations)
 1. Synchronous – real time discussions, presentation of information or data, planning activities, consensus/decision making sessions, work sessions analyzing or stratifying data, and project status reporting.

2. Asynchronous – separate time activities that include online discussions, presentation of information or data, planning activities, consensus or decision making sessions, work sessions analyzing or stratifying data, and project status reporting.
 3. Just in Time interventions – the opportunity for interventions with timely expertise. Facilitators can arrange skill based or knowledge based interventions as they observe online team activities.
- Successful project completion
 1. Deliverables – meeting agreed upon outcomes at agreed upon quality levels that become the specifications of any project.
 2. Adherence to Project Schedule

Research Design

The proposed research project will model a Type I developmental study that aligns with more traditional evaluations where the primary research focus will be on the product/program evaluation and not the development process. The development process will be described and analyzed while the online platform, as a product, will be evaluated. This research project proposes to study the impact of an existing (recently developed) online platform (product/program) on student performance with actual business projects. The product of this research will clearly be a report on lessons learned from the use of a unique online platform to facilitate and impact student teams' effective and efficient work on business projects.

Background

The evaluation of the web-based intervention will be established within a quality operations course. This Quality Principles course has 3 main learning components; review of foundation principles of quality theory, supplemental discussion issues in quality applications today (team building, organizational culture, leadership, etc.), and a business project simulation. The business simulation is an actual Continuous Improvement project completed for a Midwest organization that has been transitioned into an interactive project simulation. The project is very structure in the problem solving process as well as its required outputs, schedule, and level of accuracy. Students work in teams on the project by moving through the Plan-Do-Study-Act cycle. The cycle is broken down into a 7-phase problem solving approach with required procedures and techniques for data gathering, analysis, consensus, and decision-making. The project schedule identifies specific outputs to be completed through out the problem solving sequence including flow charts, control charts, Cause and Effect diagrams, and Pareto Diagrams. The prompt and interaction cycle is flexible but typically follows a facilitator prompt, intra team interaction, project schedule management, facilitator intervention, Work in Process outputs reviewed, team or individual interaction with the facilitator, project outputs, next prompt from facilitator.

The baseline class completes the entire project in the classroom (computer lab) with minimal outside of class interaction. A traditional business meeting format includes the team interaction as well as the facilitator/faculty participation. The meetings include work activities such as general feedback, tool development instruction, process prompts, and software application instruction.

The web-based intervention is integrated in an identical section of the quality operation course. The three main learning components remain the same with the exception being the web-based delivery and project interaction of the Continuous Improvement project. The project is facilitated entirely online including all feedback, tool development instruction, software instruction, etc. Lotus Domino and Course Info's Blackboard platforms provide threaded discussion boards, real time chat function, e-mail, file posting capability, and online work space usage.

Data to be gathered

Primary data to be gathered on frequency of access and interaction and successful project completion includes: attribute data counts on number of uses of online features (chat function, desk top video conferencing, discussion board postings, etc.), variables data on amount of time using online features as % of time on project with team and as individual contributor., attribute data on number of contacts with project data, team members, analysis features, communication, and project status information., attribute (yes/no) data on meeting project specified deliverable milestones, and attribute (yes/no) data on meeting project specified schedule milestones.

Sub study data to be gathered includes: qualitative data on student satisfaction with online platform, qualitative data on student satisfaction with project completion, qualitative data on student satisfaction with online learning environment, qualitative data on faculty satisfaction with student's demonstrated expertise and participation

Methods of Data Collection

Descriptive research method – This research method will be used to describe what is the impact on using online interventions for access, interaction, and project completion. We will summarize data (basic central tendencies – i.e. mean number of chat room intervention usage, variations – i.e. variation of measured time interacting with data posted on web site, percentages – i.e. percent of students satisfied with use of web based environment to drive business projects, and correlation between variables – i.e. measure the relationship between those students who indicate a positive attitude toward web based platform usage and number of times interacting with video conferencing feature) and review it for explanations specific to successful online interventions for effective project management. The descriptive research will also provide validation on the level of effectiveness interactive web based platforms can have on project completion.

Method of Data Analysis and Instruments

Descriptive statistic analysis – analysis will include graphics that aid in data stratification, consensus building, analysis, and decision-making. Instruments will include surveys and tally sheet/observation. This analysis will be used to represent the respondent profile, basic levels of satisfaction with online platform, baseline levels for project activity usage of online technology components (chat feature, desktop video conferencing, etc.), descriptions of use of each technology component (chat feature for brainstorming, desk top video conferencing for team data analysis, etc.), and measurement of intervention impact on team project performance. Instruments will include spreadsheet software (Excel), statistical software (SPSS), and presentation software (PowerPoint).

Cross tabulation Analysis – analysis will include graphics that aid in the interpretation of key relationships in attitudes, technology usage, and technology effectiveness. Instrument will be a survey. Software will include statistical software (SPSS) and presentation software (PowerPoint).

Variation Analysis – analysis will include attribute and variables data recording, control chart design, and control chart interpretation. The instrument will be observation/tally sheet, participant responses on checklist, and survey. This analysis will be used to represent the performance of data collected over time including counts of each tech component usage during project activity, time spent with each tech component during the project activity, determine special cause variation existence, etc.. The performance tracking will be used as baseline and as measurement to determine whether online interventions improved access, interaction, and project completion. Software will include Statistical Process Control Software (SQCPak).

Attitude Pattern Profile – analysis will include qualitative interpretation of discussions including attitude toward online technologies, use of technologies in education, use of technology in project management, team building, etc. The instruments will be interviews and focus group. This analysis will be used to verify and expand information collected and analyzed from surveys.

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