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Bollenback, D., & Kappers, W. M. (2018). Assessing the Effectiveness of Instructional Technology Tools in Online Business Programs. *Intersection of Assessment and Learning, Winter-Spring*(2018). Retrieved from https://commons.erau.edu/publication/877

Assessing the Effectiveness of Instructional Technology Tools in Online Business Programs

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January 14, 2018

Abstract

An evaluation rubric was developed to assess instructional technology tools used within online business programs to enhance learner engagement and content presentation skills. The evaluation was designed to determine if the instructional technology within the lesson helped to engage the learner, impact the assessment of outcomes, and improve the ability to present the content of the learning material. In this case study example, an instructional lesson was developed to instruct learners in creating a Work Breakdown Structure (WBS) using a project management software tool. This lesson was designed to be completed in 30 minutes or less. Step-by-step guides for obtaining a free copy of the project software application and creation of a WBS, including a visual example of a finished WBS, were built into this lesson. The lesson also included performance objective alignment to support future analysis of student performance across all courses in which this lesson existed within the Learning Management System (LMS). This evaluation rubric was built into the LMS for the evaluation team (n= 69) and yielded highly positive results of the training lesson across five categories of evaluation: (a) Technology Use (24.05/25), (b) Learner Engagement (19.05/20), (c) Goals and Objectives (19/20), (d) Assessment Value (19.05/20, and (e) Content Presentation (14.05/15). The rubric is one form of evaluation to address assessment elements within courseware development and will be validated in future research projects.

Overview

An evaluation rubric was developed to assess instructional tools used within courses to improve learning. This case study concerns using a project management software tool for creating a Work Breakdown Structure (WBS) within business programs, such as the Bachelor of

Science in Technical Management and the Master of Science in Project Management. A thirty-minute lesson includes a step-by-step guide for obtaining a free copy of the project management software tool software application and creating a WBS, concluding with a visual example of a finished WBS. The lesson also included performance objective alignment to support future analysis of student performance across all applicable courses within the Learning Management System (LMS). The intended audience for this lesson was learners within the project management minor currently enrolled in the Bachelor of Science in Technical Management degree program.

A formative evaluation was completed to ensure the lesson was designed well and met the instructional design criteria required by the program. The goal of the evaluation was to determine the appropriateness of the training lesson in relationship to other activities within the course and alignment with other courses in the program. For ease of use, the evaluation rubric was built into the LMS for the evaluation team (n= 69) and once completed yielded highly positive results of the training lesson across five categories of evaluation: (a) Technology Use (b) Learner Engagement, (c) Goals and Objectives, (d) Assessment Value, and (e) Content Presentation. The evaluation also included interviews and aggregated rubric results from learners, an instructional design team, and subject matter experts. The rubric will continue to be used and validated in future research projects. The intent of this article is to give the motivation for the rubric's use and initial findings.

Design

This was a mixed methods study using rubric evaluations and interviews. The subject matter experts and the instructional design team were provided with an adaptation of the

exemplary course rubric (Appendix A) previously used to assess instructional design. This rubric was completed online, and students were sent a formative evaluation protocol to ensure each participant was fully aware that all information collected within the interviews would be kept confidential and that the interview was completely voluntary. Once consent was given, an interview was conducted with the learners after completing the lesson. Aligned with the foundations of good qualitative interpretative research (e.g., Creswell, 2007;Glesne, 2011), the interview responses were coded to find trends and related responses. The interviews were analyzed again to minimize the number of categories and to identify emerging themes. The themes were validated by comparing the results with the aggregated rubric results from the instructional design experts and subject matter experts.

Participants

The subjects for the formative evaluation using the evaluation rubric included subject matter experts, the instructional design team, and business degree seeking students with various levels of prior experience and knowledge of project management concepts and tools. The subject matter experts were instructors and instructional designers. The instructors (N=6) were grouped into categories; those who were considered experts in the field of project management or those who have taught many courses in the program and with some considered to be course monitors indicating a high familiarity with the material. The instructional designers (N=6) were experts in designing courses and rubrics within the LMS and were experienced with project management courses. It should also be noted that some of the subject matter experts were also certified project managers and, therefore, very familiar with the WBS process.

The new student group (n=16) included anyone having little knowledge of the WBS, and who was not familiar with the project management software tool. These were postsecondary students ages 25 and older, many of whom were military with little background in using software applications. The second learner grouping (n=22) was selected for being partially familiar with project management phases, but not necessarily familiar with how to create WBS. This second group had some experience using software applications, but not the project management software tool. This learner grouping represented an intermediate target group. Lastly, the third learner grouping (n=19) represented the intermediate-to-advanced target group. These students were well-versed in project management phases and knew how to create a WBS outline. This grouping was also familiar with using the project management software tool and had hands-on experience in managing projects within the workplace. However, while experienced, this group did not have experience with creating a WBC using the project management software tool,

Instruments

The WBS activity was designed within the LMS and included an evaluation rubric that aligned to the lesson objectives. An email with account instructions was sent to the experts along with the procedure for completing the evaluation rubric. The evaluation rubric was also set up within the LMS to allow the subject matter experts and the instructional design team to fill out the rubric online for ease of use. Once the evaluation rubric was completed, a statistical report was created to display the summary results. The WBS was evaluated using the work breakdown structure rubric. Phone interviews with students were also conducted with open ended questions regarding the overall impression of the use of the project management software within the courses. The results of the interview were collected and used after completion of all learner interviews. The results were coded and categorized to identify themes. The themes were verified

by a self-check by the instructional designer. The learner was also given access to the instructional design interactive rubric to evaluate the effectiveness of the integration of the project management software tool within the lesson. The results of the interview questions and the instructional design rubric were used to measure the effectiveness of the lesson and whether or not the learner was able to meet the performance objectives outlined in the lesson.

Procedures

The experts were sent an email with the protocol document that was signed and sent back to the instructional designer. Once the signed document was received, a second email was sent with account information and instructions for accessing the lesson within the learning management system. This email also contained instructions for accessing the interactive rubric. The experts then completed the lesson. Upon completion of the lesson, the experts used the rubric to score and submit the results. The lesson and evaluation were completed within two weeks. Submitted results were captured and reported back with a rubric statistics report.

All learners were sent the protocol document to be signed and sent back to the instructional design team. Once the protocol document was received, the learners completed the lesson within the Learning Management System on their own. The learners were given 30 minutes from the time they access the lesson to complete the lesson. Upon completion, a member of the instructional design team used the WBS rubric to assess the deliverable. A phone interview was setup within the following week with the learner. The learner also completed the instructional design interactive rubric to evaluate the effectiveness of the integration of the project management software tool within the lesson. All results from both the learners and the experts were compiled in the final evaluation results of the print-based instructional lesson.

A phone interview was conducted, and results of the interviews were collected and coded and categorized to identify themes. The themes were verified by a self-check by the instructional designer. The learner was also given access to the instructional design interactive rubric. The results of the interview questions and the instructional design rubric were used to measure the effectiveness of the lesson and use of the instructional technology, which included whether the learner was able to meet the performance objectives outlined in the lesson.

Results

The evaluation rubric was categorized with 25% weighted on the use of technology, 20% on learner engagement, 20% on goals and objectives, 20% on assessment value, and 15% on content presentation. The concluding report presented the following results, which were overwhelming positive as categorized under the five assessment areas of the rubric: (a) Technology Use (24.05/25), (b) Learner Engagement (19.05/20), (c) Goals and Objectives (19/20), (d) Assessment Value (19.05/20, and (e) Content Presentation (14.05/15). Interviews were also conducted but varied based on the level of involvement from subject matter experts, the instructional design team, and learners.
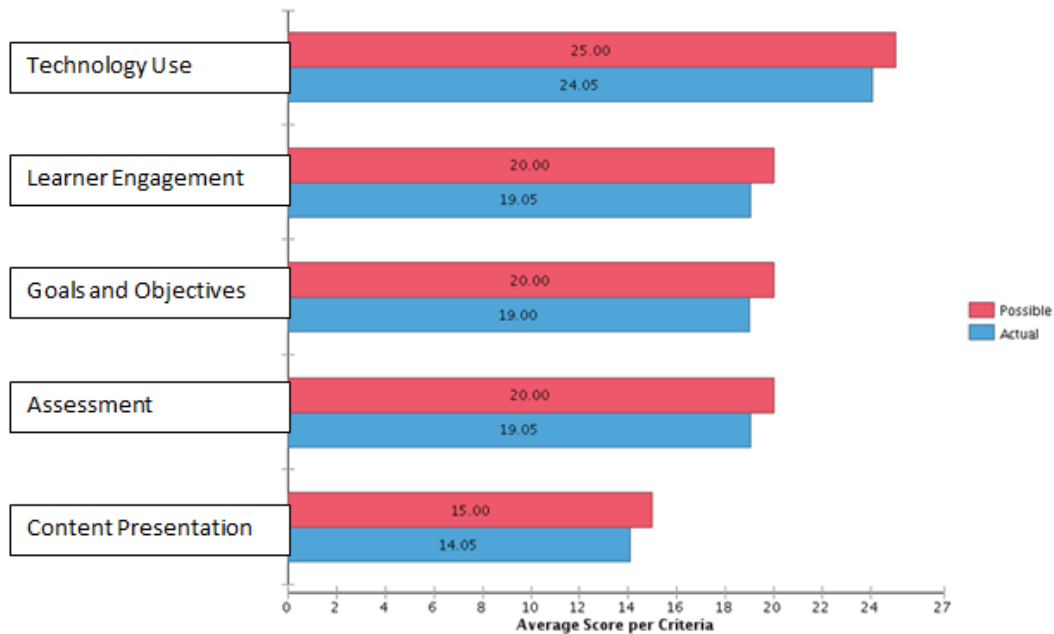
Figure 1: Rubric Statistics Report Results

The following coding themes are the end result of the training lesson assessment:
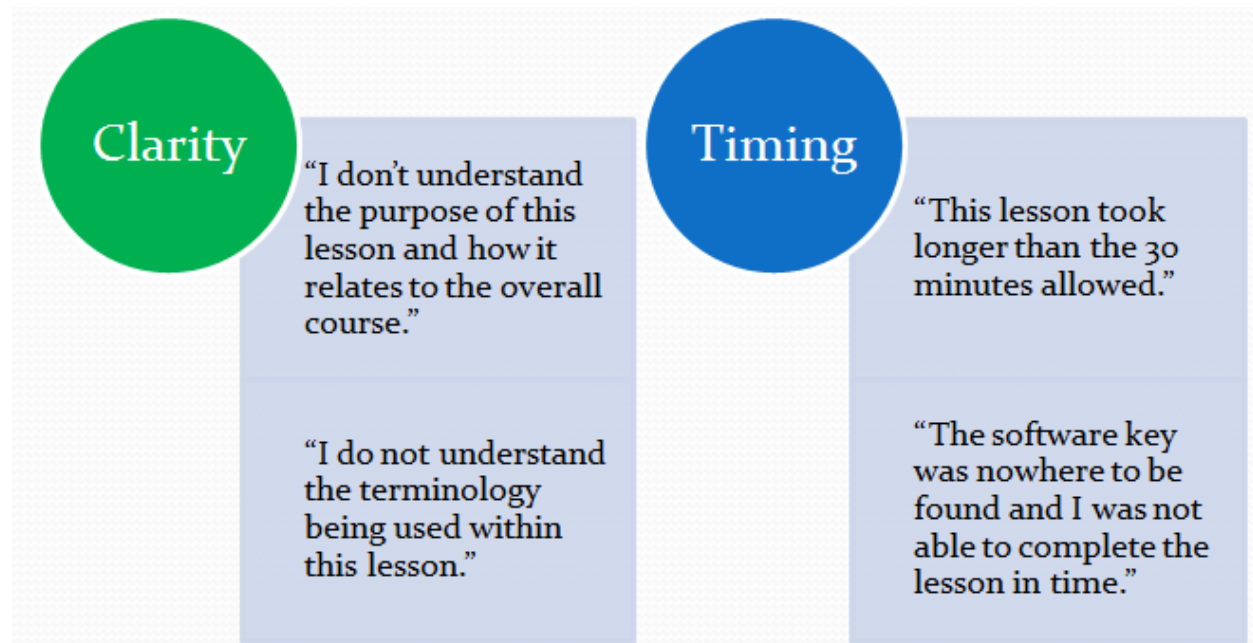
The subject matter experts, who had been in the program curriculum for a longer period, indicated that the instructional materials were clear, and they had no trouble knowing what to do at first glance. They understood the concepts from the onset, and therefore, easily followed the set of instructions related to the concepts to create the WBS. The subject matter experts, having less involvement in the overall development other than teaching the course one time a year, were not so impressed with the training lesson at first glance. They felt more clarity was needed in the beginning instructions. The more advanced learners, who had been in the program and experienced with the curriculum for at least a year, also felt that the lesson was easy to follow, however the new learners had more difficulty with the terminology used within the training lesson since they were not as familiar with project management terminology.

The structure and placement of the instructional materials were within good design standards according to all interviewed, except for the WBS example. The experts and learners on all levels agreed that the example WBS should be place in a separate document and more clearly labeled. Both advanced experts and experienced learners felt the instructions were intuitive. However, the newer experts and learners took more time to go through the print-based lesson. On average, the lesson took 40 minutes to complete rather than the expected 30-minutes. The most confusing part of the lesson appeared to be after the software was downloaded and a software key was needed to be obtained. These directions were not included as an instruction in the materials alongside where and when to enter the key within the software application. Therefore, it was determined that additional details and instructions were needed within the training lesson. Overall, all experts and learners would recommend this lesson to a colleague or friend once more detail and clarity has been added to the instructions.

Conclusion

Based upon the results of this first round of evaluation, the authors will revise the instructional materials a more detailed step-by-step document explaining in detail how to obtain the product key and where to insert the product key within the project management software tool. Additionally, an overview document will be included to explain the lesson's purpose alongside an alignment to the performance objective. Lastly, it was confirmed that a glossary should also be included for the learners to explain the terminology as it relates to the lesson.

In conclusion, we found this evaluation rubric to be useful in obtaining invaluable feedback with regard to evaluation of the inclusion of tools for learning. While the use of the project management software worked well for those who had more project management experience, there were several aspects within the design of the course activities which required additional training and instructions for both instructors and learners.

APPENDIX A: INSTRUCTION DESIGN RUBRIC

Sub-Category (weight)	Exemplary 5-6	Accomplished 3-4	Promising 2	Incomplete 1
Goals and Objectives (x3)	• Goals and objectives are easily located within the course • Goals and objectives are clearly written at the appropriate level and reflect desired outcomes • Goals and objectives are written in measureable outcomes (students know what they are expected to be able to do) • Goals and objectives are made available in a variety of areas in the course (within the syllabus and each individual learning unit)	• Goals and objectives are located within the course syllabus or the individual learning units • Objectives are written to reflect desired learning outcomes, although not all are written as measureable outcomes • Students have some understanding of what is expected of them	• Goals and objectives are not easily located within the course • Goals and objective are not clearly written in measurable learning outcomes • Students may be unsure of what they are expected to be able to do • The level does not match the desired outcomes	• Goals and objectives are not easily located within the course • Some are missing and others poorly written • The level does not match the desired learning outcomes
Content Presentation (x3)	• Content is made available or "chunked" in manageable segments (i.e., presented in distinct learning units or modules) • Navigation is intuitive • Content flows in a logical progression • Content is presented using a variety of appropriate mechanisms (content modules, single pages, links to external resources,) • Content is enhanced with visual and auditory elements; supplementary resources are made available and are well-integrated with other course materials (integrated publisher resources, e-textbooks, course manuals, etc.)	• Content is made available or "chunked" in manageable segments (i.e., presented in distinct learning units or modules) • Navigation is somewhat intuitive, but some "exploring" is required to determine the flow of content • Content is presented using a variety of mechanisms (content modules, single pages, links to external resources, RSS Feeds, print material) • Visual and/or auditory elements occasionally enhance the content; supplementary resources are made available (course CDs, textbooks, course manuals, etc.)	• Some content segments are overly large (or possibly too small) for the specified objectives • Navigation is only occasionally intuitive, thus the flow of content is sometimes not easily determined • The design does not avail of the content presentation tools (content modules, single pages, links) • Few or no visual and/or auditory elements are used to enhance the content • Supplementary resources may be made available (course CDs, textbooks, course manuals, etc.)	• Content is not "chunked" into manageable segments; • Navigation is not intuitive and the flow of content is unclear • The design does not avail of the content presentation tools (content modules, single pages, links) • No visual or auditory elements are used to enhance the content; • Supplementary resources are not made available (course CDs, textbooks, course manuals, etc.)

Sub-Category (weight)	Exemplary 5-6	Accomplished 3-4	Promising 2	Incomplete 1
Learner Engagement (x3)	• It is clear how the instructional strategies will enable students to reach course goals and objectives • Course design includes guidance for learners to work with content in meaningful ways • Higher order thinking (e.g., analysis, problem solving, or critical reflection) is expected of learners and explained with examples or models • Individualized instruction, remedial activities, or resources for advanced learning activities, such as integrated publisher resources, are provided	• Instructional strategies are designed to help students to reach course goals and objectives, although this relationship may not be obvious to learners • Guidance is provided, but could be improved with greater detail or depth • Higher order thinking is required for some activities but is not well-explained or supported (e.g., by providing examples of "good answers") • Differentiated instruction (such as remediation) may be available on a limited basis	• It is not clear how the instructional strategies will help learners achieve course goals and objectives • Guidance in using content materials may only be provided on a limited basis • Higher order thinking is not required or encouraged • Differentiated instructional opportunities are not provided, although there may be supplementary content resources available	• Instructional strategies do not provide students with skills needed to achieve course goals and objectives • Content is provided but it is not clear what students are expected to do with it • Higher order thinking is not expected from students • No supplementary resources or activities are provided for remediation or advanced study
Technology Use (x1)	• Tools available within the LMS are used to facilitate learning by engaging students with course content • LMS tools are used to reduce the labor-intensity of learning (e.g., providing links to needed resources where they will be used in the course, integrating publisher resources that are tailored to the course materials, and providing streamlined access to supplementary materials) • Technologies are used creatively in ways that transcend traditional, teacher-centered instruction • A wide variety of delivery media are incorporated into the course • An effort has been made to use low-cost or no-cost materials when available	• Tools available within the LMS could be utilized more (or more creatively) to engage learners with course content • LMS tools are made available to assist students, but could be organized or arranged for even greater usefulness • Technologies within the course are used in many cases merely to replicate traditional face-to-face instruction • There is some variety in the tools used to deliver instruction	• Tools available within the LMS are not used to their full extent or not used when it would be appropriate to do so • Only a few tools (of those available within the LMS) are used in a way that streamlines access to materials and activities for students • Technologies within the LMS are used primarily by instructors and not students ("students as recipients of content" model) • There is little variety in use of technologies within the LMS	• Technologies used within the LMS do not engage students with learning • Tools that could reduce the labor-intensity of online instruction are not utilized • Students are not expected to use technologies available within the LMS • Only a few technologies available within the LMS are used

Sub-Category (weight)	Exemplary 5-6	Accomplished 3-4	Promising 2	Incomplete 1
Expectations (x3)	• Assessments match the goals & objectives • Learners are directed to the appropriate objective(s) for each assessment • Rubrics or descriptive criteria for desired outcomes are provided (models of "good work" may be shown, for example) • Instructions are written clearly and with sufficient detail to ensure understanding	• Assessments match the goals & objectives • Rubrics or descriptive criteria for desired outcomes are included for some assessment activities • Instructions are written clearly, with some detail included	• Students are assessed on the topics described in the course goals and objectives • There may be some explanation of how assessments will be scored/graded Instructions lack detail that would help students understand how to complete the activities	• Assessments bear little resemblance to goals & objectives • Expectations or grading criteria are not provided • Instructions are limited or absent
Assessment Design (x3)	• Assessments appear to measure the performance they claim to measure (e.g., activities are explained using appropriate reading level and vocabulary) • Higher order thinking is required (e.g., analysis, problem-solving, etc.) • Assessments are designed to mimic authentic environments to facilitate transfer • Assessment activities occur frequently throughout the duration of the course • Multiple types of assessments are used (research project, objective test, discussions, etc.)	• Assessment activities have "face validity" (i.e., they appear to match the curriculum) • Some activities involve higher order thinking • Assessment activities may focus on tasks similar to real-world application of skills • Multiple assessments are included; at least three different types of assessments are used	• It is not clear whether the assessment activities actually measure the desired skill • The vast majority of assessments require only low-level thinking (memorization, for example) • Assessment activities typically do not include tasks that are relevant beyond the scope of this course; multiple assessments are included • Two types of assessments are included, at a minimum	• Assessment activities appear to lack validity due to bias, lack of clarity in questions or tasks, or because students are evaluated on performance unrelated to the stated objectives • No higher-order thinking skills are required to complete assessment activities • There is little or no evidence of authenticity built into assessments • Assessments are too few and far apart for the course content
Self-assessment (x1)	• Many opportunities for self-assessment are provided; • Self-assessments provide constructive, meaningful feedback	• Some self-assessment activities are included • Self-assessments provide feedback to learners	• There may be self-assessment activities, but they are limited in scope and do not offer useful feedback	• A few self-assessments may be included, but they offer little more feedback than flash cards

Accommodations for Disabilities (x1)	• Supportive mechanisms allow learners with disabilities to participate fully in the online community • The design and delivery of content integrate alternative resources (transcripts, for example) or enable assistive processes (voice recognition, for example) for those needing accommodation • Links to institutional policies, contacts, and procedures for supporting learners with disabilities are included and easy to find • Design factors such as color, text size manipulations, audio and video controls, and alt text reflect universal accessibility considerations	• Supportive mechanisms allow learners with disabilities to participate in the online community for most activities • The design and delivery of content integrate some alternative resources or enable assistive processes for those needing accommodation • Links to institutional policies, contacts, and procedures to support learners with disabilities are included but may not be easy to find • Design factors such as color, text size manipulation, audio and video controls, and alt text have been considered in some cases	• Supportive mechanisms allow some learners with disabilities to participate fully in the online community • The design and delivery of content do not include alternative resources nor enable assistive processes for those needing accommodation • Links to institutional policies, contacts, and procedures to support learners with disabilities are not evident • Design factors such as color, text size manipulation, audio and video controls, and alt text have not been considered	• Supportive mechanisms allow some learners with disabilities to participate in the online community for some activities • The design and delivery of content do not apply alternative resources nor enable assistive processes for those needing accommodations • Links to institutional policies, contacts, and procedures to support learners with disabilities are not evident • Design factors such as color, text size manipulation, audio and video controls, and alt text have not been considered

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