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Abstract
This paper will discuss how the backward design process (Wiggins & McTighe, 2005) was applied to develop a quality management course for adult learners. Although the backward design process was developed for use by elementary and secondary teachers, this alternative design methodology compliments the special requirements of adult learners by maximizing learning and understanding. Increased understanding may then positively influence the success of a quality management program within the workplace.

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Management

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Introduction

Adult learners often have specialized needs and may bring different motivations to learning environments than traditional aged students (Cranton, 2006). For those who develop and plan workplace training programs for adults, these needs must be taken into consideration during the development, creation, and implementation of workplace educational programs.

A great deal of adult learning takes place in the work environment, and workplace educational programs often focus on process improvement and strategic organizational change (Kleiner, Carver, Hagedorn, & Chapman, 2005). The introduction of a quality management system can offer solutions for some of the concerns above and many other business issues, but successful implementation of a quality management system is often a significant change, requiring the support and understanding of all employees (Das, Pagell, Behm, & Veltri, 2008). This is especially true in bulk product processing industries such as agricultural storage facilities where control and replication of processes requires a new business philosophy for both management and employees, (Hurburgh & Lawrence, 2003).

This paper will discuss how the backward design process (Wiggins & McTighe, 2005) was applied to develop a quality management course for adult learners. Although the backward design process was developed for use by elementary and secondary teachers, this alternative design methodology compliments the special requirements of adult learners by maximizing learning and understanding. Increased understanding may then positively influence the success of a quality management program within the workplace.

Quality Management Systems for Bulk Processing Operations

Although the process controls and verification of standards inherent to quality management systems are not new to other world industries, these ideas are a radical departure from the commodity-based system typical of agricultural processing firms (Hurburgh & Lawrence, 2003). Preliminary research on the use of quality management systems within an agricultural processing facility demonstrated several benefits, including increased operating efficiency, a better ability to meet customer specifications, and tighter security controls (Laux, 2007).

When transitioning from a commodity system to a controlled quality-based system, one of the biggest challenges when implementing such a system in many organizations is the management and retraining of personnel. Although quality management systems have been shown to increase revenue, improve inventory management, and allow increased compliance with legal regulations in the commodity agricultural environment (Laux, 2007),

these improvements cannot be realized if employees are not trained appropriately for their new tasks. For this reason, workplace training plays a major role in the successful adoption of quality management systems.

Adult Learners in the Workplace

Increasingly, the adult work force in the United States is participating in work-related educational activities. Forty percent of adults surveyed stated they had participated in a formal occupational education program, and 58 % reported taking part in an informal learning activity related to their job during the 2002-2003 calendar year (Kleiner et al., 2005). With this increase in educational activity has come concern and interest regarding the most appropriate learning style for adults.

Several components must be considered when working with adult learners. Cranton (2006) describes adult learning as voluntary, but she acknowledges that motivation and interest levels may be dependent on several components which cannot be controlled by the educational facilitator. Ortega et al. (2003) suggest the success of non-credit educational programs and curriculum depend heavily on the appropriateness and relevance of the subject matter content. Cranton (2006) agrees on the relevancy of the content but adds that a strong leader or facilitator can improve even mandatory educational programs. Chrusciel (2004) believes the perception of personal gain by participants also plays a role in how successful an educational program (and the change which accompanies it) is. These are just a few of the factors which must be addressed when developing an adult education program for the workplace.

Traditional curriculum and program development approaches have used the theoretical framework developed by Tyler (1949). This framework develops curriculum by answering four fundamental questions:

1. What is the purpose and goals of the curriculum?
2. What educational experiences must be provided to meet these goals?
3. How must the educational experiences be organized for the most effective instruction?
4. How can the goals be evaluated to determine the effectiveness of the educational experiences?

Although Tyler's approach has been validated and tested by countless curriculum professionals since its inception, some scholars see major shortcomings to this approach. Tyler's framework is a model of efficiency, standards, competency, and cost effectiveness – leading to a technical perspective of curriculum planning that has been the hallmark of career and technical education for several decades (Plihal et al., 1999).

Plihal et al. (1999) suggest that many adult learners do not function well under Tyler's approach or by using a technical perspective. Moreover, Knowles (1984) hypothesizes that adult students are motivated more by factors internally conceived rather than forced upon them by external forces such as exams. In addition, Johnstone and Rivera (1965) stress that adults prefer practical, applied and skill based knowledge over academic, theoretical, and informational knowledge. To meet the needs of adults, information must be useful, applicable, and relevant to their workplace situation and context. Acknowledging the previous experience of adult learners is also an essential component of successful adult education (Dollisso & Martin, 1999). Tyler's model typically does not account for personal life experiences or any diversity in contexts and therefore is not well suited for adult learners.

Backward Design Curriculum Methodology

Several curriculum design methodologies have been introduced as alternatives to Tyler's model and one of these is backward design. Backward design differs from traditional curriculum design in several ways. First, rather than defining goals, developing content around these goals, and assessing the goals at the end of the unit, backward design begins by determining what students should know at the end of the program or unit (called big ideas) and works backward from there to develop an assessment framework, create learning activities and align content appropriately.

Second, rather than treating all areas of knowledge as equally important, content areas are classified by relative importance within the curriculum. After determining which topics are the most important, educational activities and the curriculum scope and sequence can be developed based on the significance of the concepts rather than

simply moving sequentially from topic to topic.

A final difference between backward design and other curriculum approaches is the emphasis on the learning activities. Rather than determining the content based on a textbook or other external teaching aid, learning activities are developed to engage students so they understand concepts and patterns important to comprehension of the big ideas for the topic or program. Although these differences may not seem significant, they represent a radical and revolutionary departure from conventional curriculum design methodologies.

Although the backward design procedure is not intended to be a rigid methodology, it does follow a thoughtful and purposeful path focused on maximizing student learning. Backward design can be summarized by three steps (Wiggins & McTighe, 2005):

1. Identify desired results
2. Determine acceptable evidence
3. Plan learning experiences and instruction

Because the curriculum approach of backward design complimented many of the characteristics of adult learners, the backward design approach was chosen as the curriculum design methodology for the development of a continuing education program on quality management systems for a professional organization within the grain processing industry. The next section of the paper will describe the backward design methodology as it was applied to a quality management systems course for adult learners.

Methodology

The first step of identifying the desired results is perhaps the most difficult because it requires the instructor to prioritize and make choices about which content to include and which content to drop from the program. Ideally, educational programs could cover every conceivable bit of information the learner could possibly need, but this approach is not possible or practical. As part of the process of prioritizing subject area content, the educator might consult curriculum standards, learning outcomes, or, as in the case with work-related education for adults, the desired behavior or task changes.

One way many educators determine the desired results is by developing broad subject concepts into enduring understandings. These understandings are the "big ideas" of the program. All students are expected to complete the educational program knowing these concepts. In addition, all course content must be connected to at least one of these big ideas and core tasks (Wiggins & McTighe, 2005). Because of the broadness of the big ideas and core tasks, an educational program often has a small number of big ideas and core tasks. The big ideas and core tasks developed for this program are listed in Table 1.

Table 1. *Big Ideas and Core Tasks of Quality Management Educational Program*

1. Quality management systems are a means of requiring discipline and reproducibility in a production process.
2. Quality management systems are easily integrated with standard operating procedures and normal business activities.
3. Quality management systems can be used as a solution for procedure-based business needs.
4. Quality management systems depend on a strong framework of management, evaluation, and cost-benefit analysis.

Once the big ideas and core tasks have been identified, the next step is to determine how to know if the learners have attained the knowledge and skills needed for these concepts by creating acceptable evidence of learning. Tasks and criteria are developed to measure the learner's level of understanding and knowledge of each big idea. For adults in a work environment, this might include criteria such as observations, performance appraisals, or unit production quotas or it may also include the ability to perform specific skills or actions. Once learner tasks and criteria are created and an evaluation plan is established, developing relevant and appropriate content to support

the tasks becomes relatively straightforward (Wiggins & McTighe, 2005). Acceptable evidence of learning for this program is identified in Table 2.

Table 2. *Acceptable Evidence of Learning*

At the end of the course, students will be able to:
1. Create a basic process flow analysis of their operations area and identify critical control points for quality, economics, and security.
2. Write basic procedures and work instructions following a prescribed quality format.
3. Integrate daily procedures and tasks into a quality management system configuration.
4. Collect and organize data from daily operations for use in evaluation and cost-benefit analysis.
5. Work effectively with other team members to continually improve facets of the quality management system.

The development of specific content is the final step. During the third step of planning learning experiences and instruction methods, the educator must consider the specific knowledge, skills, and activities needed for the learners to reach the desired results and how the information generated by these learning experiences will be presented. This portion of the curriculum includes the specific content for each learning session and may consist of an overview of the lesson, learning outcomes specific to that session, presentation format and media needs, source materials, and the facilitator or leader of the session, if applicable. A condensed example of learning experiences and instruction methods for one unit is shown in Figure 1.

Figure 1. *Learning Experiences and Instruction Methods*

Unit 4: Quality Management System in Inventory Management
Learning Outcomes:

1. Explain the financial importance of inventory management for the grain storage facility.
2. Summarize the challenges of inventory management in the grain storage facility.
3. Describe how quality management systems can address several identified inventory management issues within the grain storage facility.

Source Materials: Laux dissertation

ISO 22005, 22006, 9001:2000 documents

Hurburgh Power Point Presentations 2002-2008

Facilitator: C. Hurburgh **Media:** Power Point software

Additional information that could be added includes a bullet point outline of the content of the lesson and additional specifics on the presentation format. However, the information shown above gives both students and facilitators a good idea of the scope of the unit. At this point, the bulk of the intellectual development on the unit is complete. All that remains is to fill in the content details.

Implications and Recommendations

Introducing change into an organization is never easy and a quality management system represents substantial organizational change. However, firms which do not make strategic changes do not grow, therefore, finding an effective way to reach adult learners within an organization is imperative to continual strategic and quality improvement (Carr, 2000).

It is well known that adults learn different than younger students (Cranton, 2006). Adults have different motivations and experiences and tend to learn better in more realistic environments. The backward design methodology allows instructors the flexibility to develop learning environments based on practical, relevant, and applicable knowledge rather than being constrained by material from a textbook or other external source.

If the organization knows what information it needs to pass on to its employees, backward design can be used to develop an educational program to teach that information. In addition, the limited emphasis on testing and the ability to classify information by its relative importance gives leaders and facilitators a better tool to emphasize content that is particularly important and focus less attention on smaller points and details. Developing the evaluation plan and summative goals first allows the content of the course to be directly linked to learner evaluation, positively influencing their knowledge and achievement.

In the case of quality management systems, where employee participation and behavior are key components of the program's success, it is especially important to ensure the relevancy of the content and to have a strong evaluative framework. Backward design allows for both of these items. Because of this and the user-friendly nature of the framework from both the learner and educator perspective, the backward design methodology should be a strong contender for use in the development of any workplace adult education program.

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