
AC 2011-1974: EFFECTIVE CONSTRUCTION MANAGEMENT TEACHING STRATEGIES

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Effective Construction Management Teaching Strategies

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Abstract

While lectures are the most common way to teach students, they are not necessarily the best way to convey all types of information. Many construction management concepts are often difficult to convey using traditional lecture strategies because the information is found to be abstract and out of context for many students. This paper discusses the findings of a study conducted to identify teaching strategies found most effective when teaching key competencies of construction project managers to adults in higher education. Quantitative data concerning the key competencies of commercial construction project managers was used to develop questions to work within the five different perspectives on teaching from Pratt's conceptual framework of teaching adults in higher education. The developed questions were used to conduct a qualitative study where current faculty members of construction management colleges were queried to determine which of the five strategies, or combination thereof, was most often used when teaching the identified key competencies to construction management students. The study found consistent strategies were used in teaching the identified key competencies. The study is significant because by gaining a greater understanding of the teaching strategies found most often effective in teaching the key competencies of project managers, more effective education and training methods and procedures can be developed to facilitate the instruction of the defined key competencies, and improve the effectiveness of future project managers in the commercial construction industry.

Introduction

The management of construction projects has evolved into a complex process that requires a project manager to have substantial knowledge of business practices, expertise in the construction processes for which he or she is responsible, and the ability to lead a diverse group of skilled and non-skilled personnel in daily operations. No matter the discipline, scope, nor delivery method, to effectively manage construction projects, the project manager must have a definable set of key competencies that facilitate his/her ability to effectively lead administrative personnel, supervisors, foremen, skilled and non-skilled labor, subcontractors, and suppliers by applying learned skills, knowledge, values, ethics, and characteristics¹. A key competency is the knowledge, trait, skill, motive, attitude, value or other personal characteristic essential in performing a job². A key competency can be a hard skill, where a technical ability or proficiency is needed, or soft skills that focus on the interpersonal relationships and workplace productivity³.

In a study undertaken by Cline⁴ to determine the key competencies needed by construction project managers, it was found that effective project managers must possess fundamental construction management skills, project administration skills, business writing and communication skills, and soft skills, such as negotiation, leadership, and teamwork. Specifically it was found that the five most important skills were:

1. Leadership
2. Construction Management
3. Professional and Ethical Judgement
4. Contracts
5. Plan Reading

Construction Education

A great body of research exists that has attempted to identify the specific key competencies that are needed to be an effective project manager in the U.S. construction industry. However, much less research has been conducted to determine the most effective ways to teach identified key competencies to adults in higher education. Construction education programs are charged with providing an education that will result in a leadership role in construction. Standards and criteria for accredited construction education programs set-forth by the American Council for Construction Education (ACCE)⁵ state that CM curricula should be responsive to technical developments and should reflect the application of evolving knowledge in the construction industry. The ACCE further charges CM programs to regularly evaluate and develop curricula that reflects changing construction technologies and management trends. Information concerning effective teaching methodologies will facilitate the development of specific courses, programs, and learning activities with an end goal of developing learning treatments that facilitate a learner's mastery of CM knowledge, and the development of specific skills and competencies.

Thus, guided by literature and research on educational theory, input by construction industry professionals, standards and criteria of CM educational programs this study was being undertaken. It was the goal of this study to query current faculty members of CM colleges to gain insight as to the perceived most effective method of instruction when teaching key competencies to adults in higher education. By gaining a greater understanding of the perceived most effective way to teach the identified key competencies, more effective education and training methods and procedures can be developed to facilitate the instruction, and improve the effectiveness of future PMs in the commercial construction industry.

Educational Philosophies

It is important to understand that there is a direct correlation between an individual's beliefs, values, and/or attitudes, and that individual's basis for selecting instructional content, instruction material, interaction with learners, and evaluating the outcomes of education⁶. This is important because when we understand the basis of our personal philosophies towards education and know of the theories that are associated with those philosophies, we gain greater understanding of our teaching perspectives.

Teaching Perspectives

There are many different views as to what constitutes good methods of teaching or what sometimes are referred to as teaching perspectives. Pratt⁷ defined five teaching perspectives that he believes are the essence of good teaching. The development of the five perspectives is the result of what he describes as "a carefully written, well-researched analysis of the five major philosophical and practical orientations to teaching that influence how we live our lives as teachers." The perspectives are:

"The **Social Reform Perspective** where effective teaching seeks to change society in a positive way, allowing students to embrace the values and ideologies that are part of their work. Students are challenged to take stands on viewpoints and take social action to improve their society."

"The **Nurturing Perspective** that is based upon a belief that long-term, hard, persistent effort to achieve comes from the heart as much as it does from the head. The nurturing perspective operates under the assumption that people will be more

successful in their learning if they are supported academically and emotionally. Teaching from the nurturing perspective, learners are challenged to achieve goals while their individual growth is encouraged.”

“The **Transmission Perspective** where the teacher is a subject matter expert relative to the content being taught. The ‘stand and deliver’ approach requires the teacher to accurately put forth to the student the content to be delivered. The content is systematically covered with the delivery being varied to meet the needs of the learner.”

“The **Apprenticeship Perspective** that socializes the learner to norms and ways of working. The teacher is the master or the journeyman that serves as a mentor to the student or apprentice.”

“The **Developmental Perspective** where teaching must be planned and conducted from the learner's point of view. The needs and learning styles of the learner are considered to ensure that the content is delivered in a manner that facilitates the needs of the learner. The primary goal of the developmental perspective is to help learners develop increasingly complex cognitive structures related to the content, and then changing those cognitive structures.”

It is important to note that Pratt contends that the perspectives are not mutually exclusive views of teaching, and that the majority of teachers hold one perspective as a dominant view of teaching, but holds other perspectives that allow them to be flexible in their approach to different learners.

Objectives

The primary objective of this study was to determine the most effective ways to teach the key competencies of effective project managers to adults in higher education.

Qualitative Research Design

Semi-structured, conversational, interactive, one-on-one interviews with the study participants were conducted, allowing the inquirer and subjects to be tied in an interactive process, both influencing the other⁸. The interviews were used to gather responses to a series of independent variable questions concerning the teaching of key competencies of construction project managers to adults in higher education within the confines of the perspectives developed by Pratt⁷.

Study Participants

Study participants were a representative convenience sample of current faculty members of geographically diverse CM colleges accredited by the American Council for Construction Education. The ten study participants had a mean of 19 years in the construction industry with a maximum of 40 years and a minimum of 3 years. Years the study participants had in construction education had a mean of 9 years, with a maximum of 25 years and a minimum of 3 years. It must be noted that many of the participants stated that their years in construction education and years in the construction industry were not mutually exclusive, and that they continue to participate in the construction industry while being a construction educator. The interviews were conducted at a private, neutral location over a three-day period. Data resulting from the study was organized and then analyzed to generate categories, themes and patterns.

Research Findings

To begin the study each participant was asked, “Of the five perspectives detailed by Pratt, which perspective or combination of perspectives do you consider the most similar to your own teaching style?” All of the study participants stated they believe that the transmission perspective is used and needed much of the time to convey information that is needed to allow students to have a base knowledge of a subject. However, many of the participants stated that the transmission style was not their desired teaching style. One participant stated “there are certainly times when I don’t get ahead of the game enough and fall back to transmission, but I am always disappointed in myself if that’s where I end up”. Several study participants stated that because they were fairly new to construction education, they relied on the transmission perspective too often.

“I consider myself an expert in construction. I have spent 30 years in the industry and so therefore I’m very comfortable with the content. However, as someone that’s relatively new to academia I think it’s easy for me to fall into a transmission style.”

Another stated,

“Initially I was very transmission, but as I move along and develop in my career I’m finding that the developmental and apprenticeship styles are becoming more important. I think that’s a natural transition as we become more comfortable in what we do.”

Study participants stated they believed that their preferred style was developmental,

“Helping focus the learning to the individual learner, helping the student understand the basic concepts and then allowing them to continue moving towards understanding of more difficult concepts.”

Similar statements were made about the apprenticeship style by several of the study participants, most of whom had spent time in the construction field as a union tradesman. The nurturing and social reform perspectives were not identified as a teaching style as often as the other three perspectives; however, many stated they believed these two perspectives were a focus when counseling and advising students in life and career choices.

The second research question posed was: “If a defined set of key competencies are needed to be an effective project manager in the U.S. commercial construction industry, what is the most effective means to teach those competencies to adults in higher education?” The narrow focus of this study allowed emergent themes from the interview data to become apparent.

The following are the responses of the study participants as they pertain to the most effective way to teach the identified competencies:

Leadership

The nurturing and apprenticeship perspectives were identified almost equally as the perspectives most often used by the study participants when teaching leadership. One study participant stated,

“To teach leadership you sort of have to nurture them along and figure out how to tap into their natural abilities and then teach skills that they might need to develop their leadership skills.” Another participant stated, “I strongly believe in faculty being a role model for students at all levels”.

A side note to the study question was made by one participant that stated,

“I think that that’s interesting that leadership should come up first in the list of competencies because in my own research I have found leadership to be lacking in a lot of our curriculum. I believe that leadership is more of a soft skill or people skills. I would like to think that soft skills like “leadership” are important things for our students to have when they get out in the real world, but perhaps our students aren’t ready to learn those types of things.”

Construction Management (Management of the Construction Process)

The transmission and developmental styles were identified equally by the study participants as the perspectives most often used teaching construction management or the management of the construction process. The participants stated that the transmission style is needed to give learners a foundation for learning, but it is the developmental style that allows learners to continue in the learning process. One participant stated,

“You have to have a certain amount of transmission; you have to teach them the basics, the terminology, and the rules of the road. But I also think there’s a lot of developmental teaching that has to go along with that because when you are teaching construction management you’re kind of walking them (the students) through the process and they’re developing their skills. It’s not something you can just tell them, it’s something you’re leading them through, guiding them through the process to understand it.”

The participants stated that the developmental style works because,

“Managing the construction process is not just understanding RFI’s (Request for Information) and submittals, it’s developing relationships with people, negotiating skills, figuring out how to get from point A to point B when you have different things to deal with and different personality types to deal with, like architects and engineers.”

Professional and Ethical Judgment

Though the developmental and social reform perspectives were identified equally as the most important teaching perspective when teaching professional and ethical judgment, all of the perspectives were closely identified as important. One study participant stated, “Professional and ethical judgment goes along with students being able to develop critical thinking skills. I think using the developmental style works because it takes students time to learn and acquire those skills.” Another participant stated, “Teaching professional and ethical judgment requires the student to go through a process of talking about the norms of society, because everybody has a different definition of ethics, so it requires a style that promotes social reform.”

Contract Documents

The transmission perspective was identified as the common perspective used when teaching students about contract documents. Two of the study participants summarized the statements of all of the participants when they stated that when teaching contract documents:

“We have to build a base of knowledge for them to be able to make judgments. It’s a brief systematic approach where we stand and deliver the different attributes of the contracts.”

Plan Reading

The transmission perspective was identified as the most commonly used perspective when teaching plan reading. However, all of the study participants stated that transmission is not sufficient in itself to ensure that learners understand how to read plans.

“There is a level of transmission that has to happen, especially vocabulary so that the student can understand what words are out there and how they are used in the sense of the drawings and specifications. However it is practice that is needed. Thus we have the apprenticeship style to guide them the best we can. It’s a practice thing. You have to get used to how plans are organized and where to find things. You can talk to a student until you are blue in the face but until they practice things they don’t get it as well.”

It was also stated that,

“It can’t be done using a PowerPoint presentation, in plan reading you have got to do it. You have to give the students a set of plans and have them physically touch it, feel it, smell it and taste it to get them to learn it correctly.”

Conclusions

The study surveyed ten current faculty members of U.S. construction management colleges. A qualitative interview protocol (Appendix A) was developed that defined five teaching perspectives used when teaching adults in higher education, gathered demographic data of the study participants, inquired as to the perspective that most closely fit the teaching perspective of the qualitative study participant, and the teaching perspective most commonly used when teaching each of the ten competencies identified in the quantitative portion of the study. No individual perspective was found to be universally used in teaching to adults in higher education the identified key competencies, and that a combination of perspectives were used in most cases. This finding is consistent with Pratt’s⁷ proposition that there is no universal best perspective in teaching.

It was found that the developmental and transmission perspectives were the most commonly used perspectives, followed by the apprentice, nurturing, and social reform perspectives. The nurturing perspective was found to be used most commonly on soft skill competencies, and used significantly when teaching leadership, the competency with the highest mean result. The social reform perspective was found to be used a significant amount when teaching professional and ethical judgment, but was only identified one time when teaching the other key competencies.

The transmission perspective was found to be the perspective most commonly used by the study participants, though all believed the transmission style to be the least effective of all styles. Students early in construction education need to have an understanding of basic concepts that can be delivered in a transmission format. Similar to the construction process, the building of a strong foundation for learning must be built, allowing for the construction of further knowledge and understanding as students progress in their education. A study participant aptly stated,

“It’s like in elementary school where you started with the ABCs, then learned short words, and then learned that those words could be assembled into meaningful sentences. Eventually students are able to see the big picture”.

However, one problem with focusing on the use of the transmission perspective when teaching younger students is that younger students sometimes need more nurturing than older students. This nurturing may be needed in the form of educator, mentor, and/or career counselor.

Another theme was revealed concerning the use of the transmission perspective. It was found that instructors with the least amount of construction education used the transmission style most often. This may be because all of the qualitative study participants had began their careers in construction and then migrated to construction education. Therefore, they may have knowledge of the skills needed by students, but lack the ability to teach what they know. This finding is significant because there is a great debate as to which is more important for an instructor of construction management education, industry experience or pedagogical proficiency. Is it conceivable to teach a subject like construction management without “hands-on” experience? Is being a subject matter expert advantageous if the teacher cannot effectively put forth the knowledge to the student? The answer may be that both experience and teaching proficiency are equally important. Like the student, the educator must have a foundation of knowledge upon which to build. The construction educator must be able to evolve and grow their teaching style, reacting to the needs of their students, moving to styles of teaching that will be the most effective for the subject and students being taught.

The study revealed that instructors that had participated in an apprenticeship program while working in the construction industry were most likely to identify and use the apprenticeship perspective. This finding is consistent with Pratt’s proposition that teaching is guided by one’s perspective on teaching, and that the actions, intentions, and beliefs of a teacher greatly affect how classes are taught. These individuals believe there is no substitution for experience, and that it is real life experience that fosters the acquisition and retention of new knowledge. As teachers, the more we can put students in situations to get real life experiences, the more we can build deeper learning experiences. However, the challenge is finding an effective way to use the apprenticeship teaching style in construction management higher education curricula. Though the apprenticeship style has elements of all of the perspectives; transmission, development, nurturing, and social reform, true apprenticeship learning comes from the worksite and not from an academic setting.

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Appendix A

Qualitative Interview Protocol - Teaching Perspectives Background

There are many different views as to what constitutes good methods of teaching or what sometimes are referred to as teaching perspectives.

Pratt presents four propositions on teaching perspectives:

- Proposition 1: There is no universal best perspective.
- Proposition 2: One's actions, intentions, and beliefs guide and define the teaching perspective.
- Proposition 3: Some beliefs are more central to one's being than others, and are therefore open to change.
- Proposition 4: Improvements in instruction can focus actions, intentions, or beliefs.

Pratt defined the five perspectives in teaching in adult and higher education as:

1. Transmission:
 - Where the teacher is a subject matter expert relative to the content being taught.
 - The “stand and deliver” approach requires the teacher to accurately put forth to the student the content to be delivered.
 - The content is systematically covered with the delivery being varied to meet the needs of the learner.
2. Apprenticeship:
 - The process socializes the learner to norms and ways of working.
 - The teacher is the master or the journeyman that serves as a mentor to the student or apprentice.
 - It allows the teacher to reveal the skills needed to perform a task.
 - To be successful the teacher must not only demonstrate the skill needed, but allow the student to actually work on the task.
3. Developmental:
 - The teaching must be planned and conducted from the learner's point of view.
 - The needs and learning styles of the learner must be considered to ensure that the content is delivered in a manner that facilitates the needs of the learner.
 - The primary goal is to help learners develop increasingly complex cognitive structures related to the content, and then changing those cognitive structures.
 - Changing the cognitive structures requires the learners to be engaged by the teacher to move from simple to complex forms of thinking.
 - Changing the cognitive structures requires the teacher to bracket the knowledge, allowing the learner to construct their own understanding of the content.
4. Nurturing:
 - Is based upon a belief that long-term, hard, persistent effort to achieve comes from the heart as much as it does from the head.
 - Operates under the assumption that people will be more successful in their learning if they are supported academically and emotionally.
 - Learners are challenged to achieve goals while their individual growth is encouraged.
5. Social Reform:
 - Teaching to change society in a positive way, allowing students to embrace the values and ideologies that are part of their work.
 - Students are challenged to take stands on viewpoints and take social action to improve their society.

Interview Protocol

Interview Questions:

1. Name?
2. Position?
3. Educational Institution?
4. Years in Construction Education?
5. Years in Construction?
6. Of the five perspectives detailed by Pratt, which perspective or combination of perspectives do you consider most similar to your teaching perspective?
 - Transmission:
 - Apprenticeship:
 - Developmental:
 - Nurturing:
 - Social Reform:
7. Of the five perspectives detailed by Pratt which perspective or combination of perspectives do you consider most effective in teaching the ten identified key competencies?
 - Leadership:
 - Construction Management (Management of the Construction Process):
 - Professional and Ethical Judgment:
 - Contract Documents:
 - Plan Reading:
 - Negotiations:
 - Problem Solving:
 - Working in Partnership with Clients:
 - Analytical Thinking:
 - Scheduling:
8. Do you have any final thoughts about teaching perspectives or key competencies needed to be an effective project manager in the U.S. commercial construction industry?