

Production and Operations Management Coursework: Transforming the Industrial Factory Visits into Rich Learning Experiences

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Abstract: Exposure to real life industry working environment in industries is one of the key elements implicitly emphasized in the production and operations course work. Students taking this coursework have been assigned to visit an industrial site to gain real working experience on the subject matter. This activity is to enable students to relate their theoretical knowledge with practical aspects of their study covering the subject syllabus related to operations management including industrial unit operations, capacity, process technology, design concepts, supply chain and other operations management aspects like organizational management, safety, health, environment, society and its relations with operations performance. This research will review the literature to focus on the assessment and evaluation of student's experiences and learning gains from their industrial visit. The data of this study will be collected through the questionnaire given to each student about the experience gained and through their respective group and individual reports. Both qualitative and quantitative methods will be used for this research. At the end of this study, the researchers will be able to determine the impact of industrial visit through assessment of the students learning experience and the different skills they gained through these visits.

Key words: Operations management, industry visits, learning experiences, mixed methods, research

INTRODUCTION

Industry visit is a valuable component in the educational landscape. It takes place in various forms and can involve teachers and students from both elementary, high schools and higher institutions. Teachers are keen to participate in visits when the links to the curriculum are clear and explicit but often find it difficult to make time to initiate links with industry or to see and appreciate the wide range of curriculum-relevant activities that a site visit can offer. Student exposure to real life industries is very important as an aspect of active learning. Student learning should go beyond academics where they can develop insights, critical thinking and obtain practical knowledge as well as theoretical applications. Students are able to improve on the cognitive complexity, intrapersonal or interpersonal relationship and practical competence. Varieties in active learning can provide unanticipated roles for the future that are capable of solving challenging problems of the 21st century. Smith and Lytle (2009) reported that the five benchmarks to encourage student engagement in learning are level of academic challenge,

active and collaborative learning, student-faculty interaction, enriching educational experiences and a supportive campus environment.

The main objective of industrial talk and visit is to enable the students to better visualize what they have learned in class room to the real industrial situations. Students will also have the opportunity during the industrial visit to see the large-scale industrial processes and equipment (Aamodt *et al.*, 2011). The expected outcome of these activities is that student engagement in learning can be improved through activities outside their classroom. This methodology allows students to construct knowledge watch and learning related to operations management including industrial unit operations, capacity, process technology, design concepts, supply chain and other operations management aspects like organizational management, safety, health, environment, society and its relations with operations performance. Students will acquire a clearer idea and concept of the management of a factory and how it relates to the rest of the functional business areas such as sales, marketing, finance and accounting. This is supposed to

enforce assimilation and convergent of knowledge learned through classroom and the industrial visit to useful learning experience. Thus, this research will provide evidence to support this claim. In addition, students will be able to discover a scope of professional challenges they will have to face soon.

Research background: Many studies have been conducted by researchers about cultivating the pedagogy of experience through field trips. Among the works include those from Jakubowski (2003). Today, learning through involvement reflects a commitment to a pedagogy that is “engaged” “trans-formative” or “critical” (Shor, 1992; Wink, 2003) and “community-based” (Pellegrino *et al.*, 2001). However, many programs may find the need to adapt teaching methods to accommodate larger course sections and utilize different and innovative pedagogical approaches. In other cases, the constraints may result in hiring adjuncts from industry or terminally qualified crossover faculty from related fields such as operations management or decision sciences (Gravier and Theodore, 2008). Several operations research instructors have concluded that they can provide an operations research course with greater appeal if they focus on applications to a specific discipline (Cochran and Lytle, 2009).

Research in education has been characterized as being too small-scale and non-cumulative (Oancea, 2005). Commentators have pointed of the need for overarching reviews so that the field can build upon what has accumulated before (Stevens, 2012). As such, state of the field reviews in educational research in general will benefit the literature. More specifically, a state of the art review on ‘assessment and learning’ is necessary because purposes, mechanisms and conceptions of assessment are evolving and the relationship between assessment and learning is therefore also in a state of flux (Glaser *et al.*, 2001; Madaus *et al.*, 2009). This study embarks to investigate the knowledge gained, skill gained and conceptual learning gained by students through factory visit for production and operations management industrial study visit. Thus, it will enable an assessment of the level of student learning experience through factory visit allowing an investigation to understand the expectation and objectives and an overall achievement of industrial study visit coursework.

Literature review: Over the recent years, Production and Operations Management (POM) has been established as a key discipline in most business schools around the world. This has been the result of fundamental changes observed in the international business arena, characterized by increasing demands for quality, the

emergence of global markets, international production and time-based competition (Soteriou *et al.*, 1999). Production and operations management is the process which combines and transforms various resources used in the production/operations subsystem of the organization into value added product/services in a controlled manner as per the policies of the organization. Therefore, it is that part of an organization which is concerned with the transformation of a range of inputs into the required products/services having the requisite quality level. The OM performs a transformation role in the process of converting inputs such as raw materials into finished goods and services. These inputs include human resources, such as workers, staff and managers; facilities and processes, such as buildings and equipment; they also include materials, technology and information. In the traditional transformation model outputs are the goods and services a company produces.

Scholar who pursue studies in this area of research comes from a wide variety of disciplines such as management, the social sciences, industrial and labor economics, operations research and engineering. Objectives of industrial visit are to provide students an insight regarding internal working of companies. Industrial visits provide an excellent opportunity to interact with industries and know more about industrial environment. Industrial visits are arranged by learning institutions to students with an objective of providing students functional opportunity in different sectors like IT, manufacturing and services, finance and marketing. Industrial visit is considered as one of the tactical methods of teaching. The main reason behind this is it lets student know things practically through interaction, working methods and employment practices. It further gives exposure to student from an academic point of view. Thus, industrial visit provides an exposure to students about practical working environment. Students should have a good opportunity to gain full awareness about industrial practices. It is also an opportunity to gain awareness about technologies use in industries. Technology development is a main factor, about which a students should have a good knowledge. Visiting different companies actually help students to build good relationships with companies.

Curriculum may be defined as “a sum of activities for the learners to experience the intended changes in the ability of learners to perform in life”. Every body uses experience-based learning from the commencement of the life journey. Learning process as advocated in the theory on Experiential Education is based on learners focused and essentially is learner-centric (Crosby, 1981). The experience-based learning model is depicted as a dynamic process. According to Andresen *et al.* (1995),

experience-based learning can be characterized as involving the whole person which is (intellect, feelings and senses), recognizing and using actively all of the learner's relevant life experiences and learning experiences, reflecting continuously upon earlier experiences in order to add to and transform them into deeper understanding, intentionality of design, facilitation and assessment of learning outcomes. Not all experiences are genuinely or equally educative (Andresen *et al.*, 1995). Some experiences are more pedagogical than others and knowledge is continuously created and recreated through the process of learning that is based on experience. Experience is regarded as the source of learning that gives an alternative explanation to the knowledge production compared to the conventional teaching model (Andresen *et al.*, 1995).

Kolb's experiential learning theory of development focuses on the transaction between the internal characteristics and external circumstances, between personal knowledge and social knowledge. It is the process of learning from experience that shapes and actualizes developmental potentialities. This learning is a social process. Thus, the course of individual development is shaped by the cultural system of social knowledge. Using experiential learning theory, the facilitators are able to use personal and group experiences while taking participants through the four stages of learning associated with the theory. The summary comes from a journal of learning kept throughout the course. Summation tends to describe the type of dominant activity (thinking, feeling, watching and doing) and thus, reveals learning preferences and learning outcomes. It also serves as a tool for initial evaluation of the programme. Evaluation of the change programme requires identification of participants' learning. Wolfe and Kolb argued that for such programmes to be effective, the learner needs to be able to use all four adaptive abilities.

MATERIALS AND METHODS

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done logically (Kothari, 2004). Research is one of the ways to find answers to the designed questions (Kumar and Hoerling, 2000). This current study will embarked on collecting information on the experiences gained by the students through industrial factory visits. A mixed mode study that include quantitate and qualitative method will be deployed. Literature review, theoretical statements, survey questionnaire and interview sessions will be used in the study. Survey research involves the collection of information from a sample of individuals through their

responses to questions. Depending on the survey designed, data can be collected from many people at relatively low cost and quickly.

A research problem refers to some difficulty which a researcher experiences in the context of either a theoretical or practical situation, so called action research or philosophical research and wants to obtain a solution for the same (Kothari, 2004). The title of the research is "Production and Operations Management Coursework: Transforming the Industrial Factory Visits into Rich Learning Experiences" which appropriately covers the scope of the subject area, reflecting the sample size of students who need to take coursework that involve them to go for factory study visit. The objectives of this visit have be clearly are defined based following the formulation of the research problem. The data obtained will be analyzed and deliberated with the literature reviewed from academic journals, conference proceedings, government reports and books. Thus, discussion and comparison of the findings with findings form previous researchers will endeavor to strengthen the theoretical part of this research.

The three basic common approaches in research works are quantitative approach qualitative approach and mixed approach. Quantitative research is essentially about collecting numerical data and mathematically based methods to explain a particular phenomenon. Part of the data collection is designed specifically to enable the conversion of qualitative phenomena that do not naturally exist in quantitative form to be analyzed statically (Muijs, 2010). This approach can be further sub-classified into inferential, experimental and simulation approaches to research (Kothari, 2004). The purpose of inferential approach to research is to form a data base from which infer characteristics or relationships of population are interpreted.

The qualitative method investigates the why and how of decision making, not just what, where, when (Kothari, 2004). The qualitative approach that will be used in this study involves opinions of the respondent in the data collection process. According to Patton and Cochran, qualitative methods generally aim to understand the experiences and attitudes of respondent. Thus, in this case, it helps to understand the different perspectives of student's experiences of before and after the industrial factory visit. Qualitative research has smaller but focused samples rather than large samples.

The method that will be used to collect the primary data for this research study is through questionnaire survey and interview. The questionnaire will be distributed to the targeted individual respondent in order to get the data. Questionnaire will be used to collect and record the information about a particular issue interest.

This questionnaire is mainly made up of a list of questions which includes clear instructions and space for answers and the administrative details. This is commonly used in perception studies providing a base for systematic longitudinal studies. According to Yount, it can also be administrated efficiently in groups.

The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses (Kothari, 2004). Interview data is an approach in accessing various or narratives through which people describe their world. The interviewer pursues in-depth information around the topic. There are three types of interviews that can be conducted when carrying out the research project.

RESULTS AND DISCUSSION

Structured: Structured interviews require observance to a very particular set of rules, includes bodily posture, facial expressions and emotional affect. Reactions to participant responses should be kept to a minimum or avoided completely. The style is most useful when looking for specific information. The benefits are that it keeps the data concise and reduces researcher bias.

Semi-structured: Semi-structured interviews are a bit more relaxed than structured interviews. While researchers using this type are still cover every question in the protocol, there have some space to explore participant responses by asking for clarification or additional information. This type of interview is most useful when one is investigating a topic that is very personal to participants. Benefits include the ability to gain understanding of responses and participants' trust. Data sets obtained using this style will larger than those with structured interviews.

Unstructured: Unstructured interviews have the most relaxed rules of the three. In this type, researchers need only a checklist of topics to be covered during the interview. There is no order and no script. The interaction between the participant and the researcher is more like a conversation than an interview. Unstructured interviews are most often used in ethnographies and case studies (types of qualitative studies). The benefit is that unstructured interviews often uncover information that would not have been exposed using structured or semi-structured interviews. Data sets collected using unstructured interviews will be larger than the rest.

The type of interview used in this study is semi-structured interview. According to Diccio and Crabtree, semi-structured interview is more suitable for qualitative research. It is generally organised

around a set of predetermined open-ended questions, with other questions emerging from the dialogue between interviewer and interviewees. Other than that, semi-structured interview is a more sociable method (Jacob and Furgerson, 2012).

Data collection is conducted through a few stages. The secondary data collection is through the literature reviews. Through journals, books and related researches, the theoretical application of experiential learning theory can be determine and sorting out according to different subtitles. In the primary data collection, reports from students are reviewed before and after the industrial visits have been done. The interview questions prepared are given to the students before the industrial visits. The questions of the study are constructed to understand their learning gained, skills gained and conceptual learning gained. The respondents are students attending the course on operations management from the University who attended the industrial visits.

Data analysis include assessment of learning outcomes, the activities knowledge gained, skilled gained, the conceptual learning gained by the students, assessment of cognitive learning levels of students based on Bloom's Taxonomy (Bloom and Crabtree, 2006). After the data have been collected, the next process of this research turns is to analyze them (Kothari, 2004). The analysis of qualitative data is the most difficult part while drawing out all the discussion with some meaningful conclusions. The data is analysed by using content analysis and divided into categories with the support from computer software where necessary. The interview session is to produce transcript, then reduced the data into themes through a process of coding and condensing the codes.

Kumar and Hoerling (2000) defined research design as "a plan that describe on how, when and where the data are and to be collected and analyzed". Therefore, the researchers need to plan the flow of research study to answer the problems stated from the beginning of whether the method used is quantitative, qualitative method or mix mode. In this case, the researchers have chosen to use the mix mode method to complete the research work. The number of students taking the coursework is the population size and this is about 250 students. These students are divided into group of four people to a group. Thus, there will be a total of 60 groups. Based on Krejcie and Daryle table on sample size, the research sample size was determined as 148 students.

The questionnaire designed for students to answer comprises of three sections. Section A is on the assessment of learning experiences on production and operations management group study visit. Section B is about the assessment of learning gains of group study visit and divided into few sub-sections which is gain in

knowledge, gain in skills conceptual learning gain. Lastly, Section C is focused on overall assessment in term of understanding, expectation and objectives of student's study visit. Data collects from the respondents from the questionnaire will be analyzed through Statistical Package for Social Sciences (SPSS) Software. Descriptive and inferential statistics will be used to analyze the data. Inferential statistics is the technique that uses the sample to make generalizations about the populations from which the sample is chosen. This analysis comprises of descriptive test, bivariate pearson correlation and regression analysis to test various relationships between the independent variables and the dependent variable.

CONCLUSION

This study will focus on student's production and operations management coursework in analyzing the transformation of the industrial factory visits into rich learning experiences of students who are taking production and operations management course and attended the factory visit. The population comprises of all the third year students who are required to go for industrial visits. This conceptual research work is significant in improving student learning for future production and operations management class through academic interactive learning activities outside the classroom. It should promotes the integrating of curricular design and assessment for the coursework, build students' team work capacity, and turn industrial visit into rich learning experiences. This study is also beneficial to the teachers on teaching and transferring practical and real works to students via field based experiential learning. It is helpful in promoting university industry collaborations and engaging student to their future work environment at an earliest opportunity.

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