A study on present challenges on experiential learning of university students (University of Tehran, The Colleges of Agriculture and Natural Resources, Iran)

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Abstract

The main goal of this research has been to analyze the main challenges of experiential learning of practical courses offered in the University of Tehran, The colleges of Agriculture and Natural resources in the year 2009. Qualitative and quantitative methods of research have been used. The less dominant method of the research has been qualitative which 30 technician have been interviewed as co-instructors of practical courses. More dominant method of the research has been quantitative including Descriptive and Co- relational methods of research. 335 third and fourth year Agricultural colleges’ students studying in Agricultural majors have formed the sample population. Random and Stratified sampling method has been used. The instrument of the research has been a questionnaire having 34 questions. Cronbach’s alpha has been 0.0916 and reliability of the questionnaire has been approved by expert opinion of the professors of the department of Agricultural Extension & Education. Data analysis has been done by using SPSS computer software. Results have indicated four components are the main challenges of the experiential learning of the practical courses including (1) Insufficient educational spaces & equipments (2) less experienced instructors and technicians (3) Not paying attention to parallel and additional experiences and (4) Insufficient class management by the instructors and technicians.

Keywords: Higher education, Experiential learning, practical courses, University of Tehran, Agricultural majors

1. Introduction

Developing a supervised experiential learning for conducting practical courses is a must and not a selection, The students must be both theoretically and practically be empowered for being successful in their future employment including finding job opportunities, doing well in their responsibilities and being skillful for doing their duties with high quality, being creative along with entrepreneurial abilities (Iravani, 2005). Today agricultural education has two major purposes. First, it provides knowledge and skills needed by many individuals to enter and advance in agricultural careers; and, second, it develops agricultural literacy (Lee, 2000), and agricultural sustainable candidate development’s wisdom. To achieve its purposes, agricultural education has four basic program components; supervised experiences, student development, classroom instruction, and laboratory instruction (Broyles, 2004).

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Providing unique and essential skill development opportunities in the classroom, students are taught the principles, concepts, and theories pertinent to the agricultural specialty being studied. In the laboratory, students transform theory into supervised practice toward skilled proficiency. The linkage between classroom and laboratory teaching should be strong, clear, planned, and a purposeful one. Appropriate laboratory practice should be incorporated into every problem. Effective laboratory instruction requires teacher demonstration and supervision of student practice. Laboratory instruction in vocational agriculture serves as the major setting where students develop psychomotor skills and apply principles learned through classroom instruction. Laboratory instruction is the essential link between classroom instruction and skill development (Phipps & Osborne, 1988, p. 411).

Newcomb et al. (2004) explained the importance of laboratory instruction when they stated: When students are able to practice what they have learned, they have completed the teaching-learning cycle. Through their application students are better able to see the real meaning of theory. They have a concrete idea of relationships and better understand concepts which are interrelated (p. 216).

The concept of experiential learning is the theoretical basis for this study. Dewey (1939) was a pioneer philosopher in the area of experiential learning who believed that it was the role of educators to arrange for practices that promote more favorable experiences. Kolb (1984) suggested that the process of experiential learning can be described as a four-stage cycle involving four adaptive learning modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Powell and Wells (2002) summarized Kolb’s four stage cycle when they said:

- Stage one (concrete experience) puts the learner in the position to approach a situation and relate it to previous life understanding using feelings more than logic;
- Stage two (reflective observation) allows the learner to scrutinize ideas and reflects on the information from different points of view;
- Stage three (abstract conceptualization) allows the learner to develop generalizations or theories to use in problem solving; and
- Stage four (active experimentation) allows the learner to diagnose the situation or problem and uses behavioral skills to take action.

Experiential learning is a major component of agricultural education. Terry (1993) emphasized the importance of facilities in agricultural education instructional programs. He noted that while each of the three areas is still important (SAE1, FFA2, class work); the classroom/laboratory is disproportionately emphasized. Terry further noted “while FFA and SAE are essential parts of a total educational experience, they are of lesser importance and are more an opportunity to apply what is learned in the classroom/laboratory rather than the focus of the entire program” (p. 9). Miller (1993) stated “facilities in agricultural education have traditionally reflected the curriculum. As the curriculum expands, so do the demands placed upon agricultural education facilities. Both new and existing facilities must be designed to support a diversifying curriculum” (p. 4). Facilities are crucial to psychomotor teaching methods and enable students the opportunity to apply skills. Educators provide coaching or laboratory instruction through the use of experiments, exercises, or applied projects. Such facilities also provide an environment to simulate real world applications. Agri-science’s facilities should resemble a science laboratory (Broyles, 2004). Thompson and Balschweid (1999) conducted a study using Oregon agricultural science and technology teachers employed during the 1997-1998 school year. They found that over 83% of the respondents agreed or strongly agreed that lack of appropriate equipment is a barrier to integrating science. Providing adequate facilities to support science-based programs is difficult due to lack of existing scientific equipment and inadequate funding for the latest science based-technology.

Hamilton and Goecker (1973) conducted a research study in which 271 Indiana vocational agriculture teachers were asked what limits the laboratory use. The results indicated that 34% of the respondents stated equipment and 32.9% of the respondents stated supplies as factors that limit the use of the laboratory.

Kalme and Dyer (2000) conducted a study to determine principals’ perceptions of secondary education programs in Iowa high schools with agricultural education programs. The researchers surveyed 147 principals in Iowa high schools. The study showed that principals were uncertain as to whether agricultural education facilities and equipment were up-to-date. Shelhamer (1993) stated that “laboratory experiences must be modernized to reflect the new image for agricultural education, and that these activities must be effectively marketed to local communities”

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1 Supervised Agricultural Experience

2 Future Farmers of America
conducted by Yagh oobi and Safa (2005) in Zanjan University, Taleghani (1991) at University of Tehran indicates that analyzing the nature of agricultural activities and its relation with the natural environment need to focus on when are integrated with theoretical knowledge makes one person empowered to become effective as an expert.

Participation in agricultural development. According to Feeyoozat (1994) vocational skills and technological skills of such institutions along with theoretical capabilities be skillful and have the knowledge of know-how for full participation in agricultural development. According to Feeyoozat (1994) vocational skills and technological skills when are integrated with theoretical knowledge makes one person empowered to become effective as an expert.

Analyzing the nature of agricultural activities and its relation with the natural environment need to focus on experiential learning in conducting practical courses at higher education programs. Past research on the subject conducted by Yaghoobi and Safa (2005) in Zanjan University, Taleghani (1991) at University of Tehran indicates that there are challenges of experiential learning in many universities which must be resolved.

Agricultural sector in Iran provides 12 percent of the Gross national product, 22 percent of employment and 15 percent of non-oil exports. Based on statistics of Iran’s agricultural engineering organization there are 240,000 agricultural graduates in Iran, where 57000 of them are looking for the job. One can conclude that partly is because of lower investment in agricultural activities, but mainly because these graduates have insufficient capabilities including not enough self-reliance, not sufficient skills of know-how, and not being able to see the employment opportunities in agriculture (Nasrollahi, 2009).

Alibaygi and Gravandi (2007); Oloruntoba (2008) have indicated that undergraduate agricultural university students must be able to identify the farm problems and decide how to solve that problem. Challenges of this method are existing differences between theoretical and practical content of the university courses, insufficient access to farm inputs, proper technologies, well-trained instructors, and proper learning environment, insufficient on the job training for instructors, the challenge of making proper relationship between the theoretical, practical and the farm content and skills. The integrated content with proper quality make a guideline for better education of the university under graduate students.

According to Martin (2001) to standardize the physical activities, providing a safe learning environment, providing a supportive and positive environment can help to improve the practical courses effectiveness. Fowler (2008) experiential quality is dependent on the degree of students’ participation in the practical activities. Penrod (1985); Arengton (1983); Miller (1980); Harris & Newcomb (1985) in their studies have indicated that unwillingness of students for participation in the experiential learning of practical courses is one of the main problems of higher education in practical courses.

Bobbitt (1986) in a research have pinpointed that 91 percent of the agricultural students participated in supervised vocational agriculture have been among the best graduates in the United State of America. Bobbitt (1986) have indicated that rural employed instructors and faculty members emphasize more than city employed instructors and faculty members on supervised vocational education. Based on the same study older instructors prefer the farm supervised agricultural education while younger instructors prefer to work on programs conducted within a laboratory. Baker & Mackensen study (1993) show that there is a positive relation between participation in agricultural experiential programs and the vocational growth in agriculture. Okorley (2001) in the country of Ghana have indicated that only 20 percent of students with participated in weal practical courses were willing to be self-employed, classes conducted only by lectures are not proper in educational curriculum.

Arnold and et. al (2006) in a research have found some of the experiential challenges need to be solved. These challenges are: unawareness of the faculty members about the practical experiences, paying less attention, registering for the class, timing of practical activities, supervision on practical courses and managing the students’ activities in the plans of experiential learning.

Foster (1986) has pinpointed the negative problems which reduce the participation of the students in practical courses such as insufficient physical settings and facilities, unwillingness of the students, Allocation of insufficient time to practical courses by the instructors, and faculty members. Unwillingness of the students to prepare reports, economic factors and parallel courses taken by the students. Lambeth (1986) in his research findings indicates that there are many constraints regarding experiential learning for conducting participation of the students in the practical courses such as: students not having past agricultural experiences, insufficient inputs, too many students (unacceptable faculty – student ratio) faculty members having many responsibilities within the educational system.
they are employed. Dyer and Osborne (1995) have found some factors being effective for the success of the practical courses such as increasing the sense of accepting more responsibility about participation and conducting the practical courses, and reducing the effects of the constraints of insufficient resources, providing facilities, low motivations of both students and faculty members.

Kolb and Kolb (2006) in their research have indicated that disintegration of the practicality of the courses with experiential learning’s theory, not evaluating the processes and the outcome of the experiential learning, not supporting institutionalized educational system for development of the supervised experiential learning including: (1) developing a system within the college, (2) Empowerment of the administrators and personnel, and (3) providing resources for developing experiential learning activities.

Dyer, Breja, Ball, (2003), indicated that The major problems identified by the Delphi technique in the successful retention of students in high school agricultural education programs were: scheduling difficulties, lack of guidance counselor support, the image of agriculture, increased graduation requirements, scheduling barriers created by college entrance requirements, competition from other school activities, block scheduling, the image of the local agriculture program, and the quality of the local agriculture instructors.

Alfen and et.al (2007) believe that the lack of facilities, lack of participation and cooperation are problems of agricultural science education. Shao & bruening (2002) indicated that significant efforts have been made to reform the curricula as it is the key element needed for the formation of the new educational system. The curriculum in agricultural colleges was theoretical information based and the instruction was teacher-centered. Students usually had little involvement in teaching and learning. In addition, the value of practical “hand-on” experiences in agricultural education had been neglected. During the past decade new ideas and approaches in curriculum development and instruction have been gradually incorporated into the agricultural vocational education through new policy initiatives and a pilot project launched by the food and agriculture organization of United Nations during 1994-1998. The decentralization is one major feature of these changes.

Warner and Washburn (2009) have indicated that • Not enough equipment for hands-on activities • Inadequate funding from state • Students’ lack of knowledge about agriculture • Lack of program support from guidance counselors • Overwhelming Student’s testing • Collaboration with other curriculum departments, Inadequate college facilities to support classroom activities. Harwood (2007) have pinpointed that indeed agricultural science education rarely mentions agriculture or science as they were actually practiced. Kingerly (2010) indicates that for the success of the experiential learning activities, integration of educational theories, experiential learning theory, youth development theory and learning theories must be well selected and implemented.

Skelton and et.al, (2003), in their research showed that, Lack of basic business and management skills, Lack of university-trained staff capable of structuring and carrying out research in relevant areas were problems of agricultural education. Atchoarena and Holmes (2004), in their findings indicate the followings: Weak national support for HAE, Decreased investment in HAE by government and donors, declining standards in teaching and research, infrastructure; lack of staff incentives Low-level of Information Technology (IT).

Facilities are the linking point from classroom instruction to problem solving and hands-on experience. Facilities must be furnished with equipment and modules that are highly correlated with the curriculum being implemented. Laboratory experiences must be modernized to reflect the integration of academics with agricultural education. A facility problem being encountered is that agricultural educators do not know the essential components needed for a functional agriscience facility (Broyles, 2004). The frame work of the research has been as presented in the Figure 1.

![Figure1. Theoretical framework of researching on the challenges of the conducting practical courses at higher education’s level](image-url)
2. Research method

This research regarding the goal is applied, gathering data is surveying and from statistical standpoint is integrated qualitative (less dominant) and quantitative (more dominant) research. Regarding the qualitative part of this research 30 technicians have been interviewed, The purpose of the interview was to become familiar with the main challenges and problems mentioned by faculty members and technicians, these factors were integrated with the key points of the past research literature, and a researchers made questionnaire with 34 questions was developed. Statistical population was 2032 third and fourth year students of higher agricultural majors in University of Tehran, Agriculture and Natural resources campus at Alborz province, including Agricultural extension education, agricultural economics, Agronomy, Soil science, Horticulture, food industry, Agricultural machinery, plant protection, Irrigation engineering, and animal husbandry. 335 students were selected as the sample population based on using standard table of Krejcie & Morgans (1970). For estimating the validity of the questionnaire Cronbach’s alpha was calculate and it was 0.916. The reason for selecting the sample from the third and fourth year students was because they have passed the practical courses and is familiar with their strengths and weaknesses. Content reliability was approved using expert opinion of faculty members of the University of Tehran, department of Agricultural extension and education.

3. Results

3.1. Individual features

Based on data analysis of this research 61.5% (206 persons) are female, 38.5% (129 persons) are male, 94% (215 persons) are from cities and 6% (20 persons) from rural areas. 92.5% (310 persons) were full time students having no employment, 6.6% (13 persons) half time employed and 0.9% (3 persons) was full time employed. 8.1% (27 persons) of sample students were soil sciences’ major, 9.3% (31 persons) animal husbandry’s major, 11.9% agricultural engineering and mechanization’s major, 9.9% (40 persons) agronomy’s major, 9% (30 persons) Food sciences’ major, 7.5% (25 persons) agricultural extension and education’s major, 9% (30 persons) agricultural economics’ major, 8.7% (29 persons) plant protection’s major, 17.6% (59 persons) horticulture’s major, and 9.3% (31 persons) irrigation engineering’s major.

3.2. Students’ comprehension on the main challenges for presenting courses with acceptable quality

Students’ comprehensions about experiential learning are presented in the Table 1. Ranking the Importance of the variables indicates that students are concentrating their attention and energy just for passing the course instead of concentrating on learning skills. Second important factor is insufficient budget for practical learning’s development. It is clear that many short-comes of practical learning can be solved by sufficient budgeting. Disproportion rate of students and equipments has been in third rank. When equipments and facilities are not available, only some students do the practical work and other will watch which not a proper experiential learning is. Paying low attention to develop skills for being prepared for going to Master of Sciences level is also mentioned by students. Low access to expensive equipment, low availability of facilities, Not enough working spaces, low attention of faculty members’ participation in practical courses and low quality equipments available in the market are among challenges of experiential learning at the colleges of agriculture in the university colleges of Agriculture and Natural resources a branch of University of Tehran at Alborz province, Iran.

| Challenges                                                  | Mean  | S.D.   | C.V. | Rank |
|--------------------------------------------------------------|-------|--------|------|------|
| Concentrating on passing the practical course.               | 8.16  | 2.56   | 0.31 | 1    |
| Insufficient budget.                                         | 7.10  | 2.52   | 0.35 | 2    |
| Disproportion rate of the students and necessary equipments  | 7.22  | 2.63   | 0.36 | 3    |
| Limited content of learning skills in practical courses      | 7.44  | 2.81   | 0.37 | 4    |
| Using low cost equipment and facilities                      | 7.09  | 2.68   | 0.37 | 5    |
| Lack of necessary inputs for practical courses               | 6.63  | 2.54   | 0.38 | 6    |
| Low participation of higher rank faculty members             | 6.71  | 2.80   | 0.41 | 7    |
| Low usage of complementary training materials                | 6.55  | 2.81   | 0.42 | 8    |
3.3. Problems in providing quality practical training in college

In this study exploratory factor analysis with data reduction approach was used. The main objective of this technique is to classify a large number of variables into a small number of factors based on relationships among variables. For this purpose 34 variables were selected for the analysis. To determine the appropriateness of data and measure the homogeneity of variables on experiential learning from the viewpoints of students the Kaiser-Meyer-Olkin (KMO) and Bartlett’s test measures were applied. These statistics show the extent to which the indicators of a construct belong to each other. KMO and Bartlett’s test obtained for these variables show that the data are appropriate for factor analysis as indicated in Table 2.

Table 2. KMO measure and Bartlett’s test to assess appropriateness of the data for factor analysis

| KMO | Bartlett’s test of sphericity |
|-----|-----------------------------|
| 0.885 | Approx. chi-square 4641.848 Sig. 0.000 |

In present study out of 34 factors of experiential learning, only 30 factors were significantly loaded into four components which explained 44.603 per cent of total variance of components of challenges of experiential learning of students. However, the Kaiser criterion was utilized to arrive at a specific number of factors to extract. Based on this criterion, only factors with eigenvalues greater than one were retained. Accordingly, for components with eigenvalues over ”one” was extracted, presented in table 3.

Table 3. Number of extracted factors, eigenvalues and variance explained by each component

| component | eigenvalue | % of variance | Cumulative % of variance |
|-----------|------------|---------------|--------------------------|
| 1         | 9.444      | 26.984        | 26.984                   |
| 2         | 2.667      | 7.620         | 34.604                   |
| 3         | 1.848      | 5.280         | 39.884                   |
| 4         | 1.652      | 4.719         | 44.603                   |

The percentage of trace (variance explained by each of the four components) is also shown in Table 3 the traces for factor 1 through 4 are 9.444, 2.667, 1.848 and 1.652 respectively. The total percentage of the trace indicates how well a particular component accounts for what all the variables together represent. This index for the present solution shows that 44.603 percent of the total variance is represented by the variables contained in the components’ matrix.
Table 4. Variables loaded in the components using varimax rotated factor analysis

| Name of component | Variables loaded in the components | Factor loadings |
|-------------------|------------------------------------|-----------------|
| Insufficient educational spaces & equipments | Lack of budget and credit for providing equipment and facilities required for practical work | 0.758 |
| | Lack of vehicles for carrying out practical work | 0.692 |
| | Lack of students access to expensive devices (systems) | 0.674 |
| | Lack of facilities for carrying out practical work | 0.653 |
| | Difficulty of access to chemical laboratory for practical education | 0.649 |
| | Referring to other research centres due to lack of necessary equipment and facilities in college | 0.637 |
| | Lack of sufficient physical space for practical education | 0.573 |
| | Existence of false equipment and facilities of practical education available in the market | 0.499 |
| | Outdatedness of equipment, devices and laboratory equipment such as microscopes, etc | 0.498 |

| Name of component | Variables loaded in the components | Factor loadings |
|-------------------|------------------------------------|-----------------|
| less experienced instructors and technicians | Lack of teachers knowledge about new practical skills | 0.718 |
| | Lack of timely repair of experimental (laboratory) devices | 0.697 |
| | Lack of specialist for maintenance of devices and equipment | 0.632 |
| | Lack of skilled technicians for education of practical skills | 0.630 |
| | Repetition of some experiments by teachers in different courses (lessons) | 0.624 |
| | Inappropriateness of practical courses outline | 0.567 |
| | Lack of sufficient attention paid by teachers to practical courses | 0.531 |
| | The problem of students settlement during practical visits | 0.485 |

| Name of component | Variables loaded in the components | Factor loadings |
|-------------------|------------------------------------|-----------------|
| Not paying attention to parallel and additional experiences | Lack of paying attention to student practical skills for entering to the higher levels of education (such as MS and PhD) | 0.727 |
| | Lack of access to computer and internet in places of occurring practical courses | 0.673 |
| | Concentrating student’s attention and energy on pursuing education rather than of learning new skills | 0.585 |
| | Lack of discussion and analysis of visits | 0.566 |
| | Lack of possibility to conduct practical courses during the evenings or holidays when students have more time | 0.547 |
| | Lack of attention to the necessary skills for teaching them in some courses (such as SAS for students of agriculture, etc) | 0.543 |
| | Not using of complementary brochures and CD to complete practical training | 0.496 |
| | Disproportion between the number of students with equipment, materials and space available for practical education | 0.487 |

| Name of component | Variables loaded in the components | Factor loadings |
|-------------------|------------------------------------|-----------------|
| Insufficient class management by the instructors and technicians | Lack of separating the practical courses scores from theoretical ones | 0.715 |
| | Lack of separate evaluation of some practical credits (such as visits, etc) | 0.714 |
| | Lack of relationship with the village | 0.637 |
| | Confining practical education to some outdoor visit | 0.566 |
| | Presentation of practical education simultaneously to students of different fields | 0.552 |

Most of the variables on insufficient educational spaces & equipments were significantly loaded on first component. Therefore, a logical name which can be assigned to this component was “Facilities”. The second components included factors related to less experienced instructors and technicians with a logical name as “Qualifications”. The third component included factors related to not paying attention to parallel & additional experiences, “Complementary experiences” and the fourth component included factors related to insufficient class management by the instructors and technicians with a logical name of “Management”.

4. Conclusions

In this section the conclusion and suggestions are presented. One of main challenges of experiential learning in conducting practical courses is insufficient facilities. Laboratory and workshops do not have enough spaces for the number of students enrolled in a given practical course. Low budgeting, insufficient transportation, students and faculties not being motivated to present experiential learning opportunities with high quality.

The factor analysis’s results also indicate that for presenting high quality practical courses at the university the main constraints are: not enough physical facilities, Equipments and physical spaces. These results are same as findings of (McComas, 1970; Sutphin & Newcomb, 1983; Foster, 1986; Miller, 1993; Dyer & Osborne, 1995; Leech, 2000; Dyer & et.al, 2003; Broyles, 2004; Yaghhoobi & et.al, 2005; Arnold & et.al, 2006; Lee, 2007; Fowler, 2008; Shabanali Fami & Safa, 2008; Warner & et.al, 2009). Other finding of this study indicates that many faculty members and technicians are not well prepared regarding practical skills. Insufficient maintenance of equipments, not enough skilled technicians are also some important challenges which must be in concern to be solved.
The main challenges and problems of conducting practical courses are (1) Insufficient educational spaces, (2) Less experienced Instructors, (3) Not paying attention to parallel and additional experiences and (4) insufficient class management by the instructors and technicians.

5. Suggestions

Some suggestions are as the following:
Providing on the job training for the Instructors.
Motivate students to learn skills instead passing the course.
Increase the budget.
Develop an up to date program for conducting practical courses.
Re-engineering the programs of the practical courses regarding Contents, Methods and physical settings.

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