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Teaching floriculture: An educational experience from research to action – Case study

Kiril Bahćevandžiev^{1*}

prethodno priopćenje (preliminary communication)

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Abstract

Floriculture and Landscape management is a Curricular Unit (CU) that makes part of the BSc Degree course in Crops and Livestock Engineering (DCLE) at the Coimbra Agriculture School, belonging to the Polytechnic Institute of Coimbra, Portugal. It is an important subject in flower industry as it occupies the third place of the agricultural production in Portugal, after viticulture and arable crops. Teaching a floriculture is challenging as students' can chose it as their future professional occupation and requires a lot of collaboration between the students, teachers, and the florist industry. The purpose of this study was to define what can be the best way to stimulate future students in floriculture and define the best way of teaching this subject. For this purpose, a query was elaborated with students that followed this CU.

Key words: floriculture, industry, employment, learning and teaching methods.

Introduction

Writing about how to teach subject of Floriculture is not an easy task. There are 347 298 vascular plants accepted species (WCVP, 2020), of which 325,000 (Antonelli, 2020) are flowering plants (cut flower plants, potted plants, indigenous, edible or not, medicinal and aromatic, dangerous or/and extremely beautiful).

Floriculture, or flower cultivation, is an integral discipline of horticulture, devoted to the cultivation of flowers and ornamental plants for sale, gardens and green spaces. Floriculture is not a science, although there is applied science in Floriculture.

If students today want to compete in this global market, they must also be proficient in communication, creative, critical thinkers, and collaborators (NEA, 2011), at the same time. Jobs

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offered on market are characterized by the demands of non-routine, analytical and interactive communication skills.

The teaching model applied to the courses at the Coimbra Agriculture School, Polytechnic Institute of Coimbra, Portugal, has been used for over 135 years. The different changes and variations in education have been adapted during several years, from a practical and professional education to a university conservative education, culminating with the master's degrees.

In the beginning of the 2000s, higher education system was changed, that forced the implementation of a new variable, better known as the Bologna system, which forced a change from a classical to an educational system that emphasizes the importance of learning through practical experience rather than absorbing facts verbatim from the teacher. This encourages students to discover facts, science, studying way from a trial and an error and motivate free thinking.

What is teaching Floriculture?

Floriculture is a model of an agricultural business (we consider floriculture as a business or professional activity and not just as a subject) which deals with the most elementary to the most complicated steps of education, pedagogy, investigation, and, of course, all of these applied to real cases.

Student in an agricultural company (floriculture), is engaged with the real professional environment. During the classes (real cases), the student applies its knowledge (some are descendants from farmers and work in agriculture since very young) but must also relate the different knowledge obtained during their training in the course that they are following.

During the lessons, the student asks the professor, challenging him, wanting to know if the teacher also understands the subject, he is performing. Sometimes these questions are basic and resulted from the student's curiosity, but other times, they are purposely made.

Floriculture and Landscape management characteristics

Floriculture and Landscape management, that makes part of a BSc Degree in Crops and Livestock Engineering (DCLE). The lessons are theoretical-practical (TP). This allows the teacher to teach theory with in the laboratory/field. Different teaching techniques are applied and the students are evaluated through different “case studies”. During the practical lessons students use allowed for training in this CU, that belongs to the school and are considered as an open field laboratory, where appropriate relationships between the student, the environment and the plants are applied/developed. In the classrooms these activities are discussed using different figures, graphs, photos, in a narrative form with active participation of all of them. Different situations, described by teachers and/or students, are

analyzed, such as the adaptation or use of a certain product, certain practices (new or already used) and why the farmer applies (or not) that product, are often discussed during the lesson.

Teaching subjects in agriculture has a long tradition of informal interactions with four main components: lessons in the classroom, laboratory (inside the building and open field), supervised agricultural experience in the field, and lessons performed in a visiting agricultural enterprise with a purpose to upgrade the quality of our future graduates. (Akers, Miller, Frazee, & Haygood, 2004).

The objective of this work was to evaluate how we are training our Floriculture students and what we should teach to “produce” high-quality, graduated technicians.

Materials and methods

The methodology of Floriculture and Landscape management

To respond the challenge, surveys were carried out with 30 students from the 3rd year 5th semester who attended the lessons of the CU Floriculture and Landscape management in the academic year 2014/15. Each survey consisted of 27 questions (Table 1), divided into 4 areas (General, Agriculture as a study area, Teaching of Floriculture and How student study floriculture) and carried out online using the Google Forms, a survey management application released by Google. The responses were analyzed and calculated using before-mentioned program.

Table 1. Survey used with 3rd year DCLE students who attended the CU – Floriculture and Landscape management (2014/15 school year)

| Areas | Questions |
|------------------------------------|--|
| General | Gender of the students interviewed How many years have you studied in the course? Students age |
| Agriculture as a study area | Is agriculture a scientific area of study? Is agriculture a mixture of scientific principles and agricultural practices? Is agriculture a highly technical area of study? Do your parents like you to study agriculture? Is the image of agriculture improving? Should only students with agricultural backgrounds pursue a career in agriculture? Should more students be encouraged to enrol in agriculture courses? Are agriculture courses more suitable for male students? |

| | |
|---------------------------------------|--|
| | <p>Are higher agricultural courses easier than most other courses?</p> <p>Only students who intend to work in agriculture should get training in agriculture?</p> |
| Teaching of floriculture | <p>Do you like the way the teacher is teaching?</p> <p>Does the teacher keep the student interested during classes?</p> <p>Does the teacher motivate conversation and exchange of opinions during class?</p> <p>What other teaching methodologies would you like the teacher to use?</p> <p>Do you consider the practical part in Floriculture important for the course?</p> <p>Are the skills acquired in the Floriculture Curricular Unit sufficient for a profession in this area?</p> <p>Do you consider it essential to undertake postgraduate studies to expand your knowledge and apply it in a company created by you?</p> <p>Do you consider the objectives of the Floriculture Curricular Unit adequate to the reality of the country?</p> |
| How student study floriculture | <p>Do you study regularly during the semester?</p> <p>Do you study a few days before the frequency/exam?</p> <p>Do you take notes during the classes?</p> <p>Do you study only from these notes?</p> <p>Do you study from summaries that the teacher provides?</p> <p>Do you use the internet in your study?</p> <p>What other resources do you use for your study?</p> |

Results and discussion

Survey results

Analyzing the answers from the General area, the students interviewed were mostly male (69%) and all students were studying at Coimbra Agriculture School between 4 and 5 years (38%), with 31% coinciding in both cases, who attended classes for 3 years and more than 5 years, respectively. The age range of students attending the CU was different, older (> 25 years, 46%), followed by the age of 21 (38%), occupying a lower percentage (16%) for students aged between 21 and 25 years.

Regarding Agriculture as an area of study, most students (between 92 and 100%) recognized the importance that education in agriculture has, both, scientific and technical aspects and that the image of Agriculture in Portugal is improving (62%). 92% of students' parents support and approve their choice to study Agriculture and 85% of them are related to, or work in, agriculture. Students (92%) think that at the national level more young people should be encouraged to study in the areas of

agriculture and that 85% of students think that it should not be only men involved in agriculture. When asked to express their opinion regarding the course they are attending, only 8% of students consider that BSc Degree in Agricultural Engineering is more affordable than other courses and only 23% consider that only graduates that intend to work in agriculture should study agriculture.

Asked to express their opinion about the teaching at the Floriculture and Landscape management CU, 85% believe that the teacher keeps students interested during the classes by teaching in an appropriate way, motivating them to talk and exchange opinions about the subject taught during classes. All agree that is better to have classes in the field than being in the classroom. This practical part of the CU, 85% considered important for their training and 54% of respondents considered that the skills acquired at the CU are not enough to exercise a profession in Floriculture and Landscape management. When asked about the adequacy of the CU objectives to the reality what are the labor needs and professional reality in the areas Floriculture and Landscape management in Portugal, 85% considered it positive and the same number of students think it is important to continue their studies in a postgraduate course to increase their obtained knowledge.

When asked how they are studying and preparing for exams/frequencies in Floriculture and Landscape management, 54% of students answered that they study regularly during the semester and 92% of them are preparing the exam few days before the respective test date. During the classes, 69% of students take notes from the lessons taught, but even so, most of them (85%) study only from the notes that teacher provides. During their study, 23% of surveyed students, obligatorily use the internet to carry out research related to the subject of study and works and clarify the possible doubts that could appear, as well as the use of books, scientific articles, from the school library, and notes from other colleagues.

Teaching techniques and learning methods

The traditional teaching method in higher education is deduction, starting with "fundamentals" and moving on to applications (Felder and Silverman, 1988). Many or most of students would say that they prefer a deductive teaching -"Tell me just what I need to know for the test" (Felder and Silverman, 1988). However, students learn in different ways, observing, listening, and memorizing; reflecting and acting; through their logical reasoning and intuition.

Teaching methods in the Portuguese higher system vary. Mainly teachers teach through lectures, and demonstrate or discuss topics; some focus on principles and others on applications; some exercise memory, and others, understanding. There are also teachers who apply experiential learning theory (Trexler, Davis and Haynes, 2003) in the classroom, involving students in training experiences and then asking them to analyze and express their opinions regarding the occurrence.

The CU Floriculture and Landscape management is taught in the 5th semester with theoretical-practical classes that allows a theoretical approach to the subject mixing with the practical part carried out in the open field, greenhouses or during the study visits. During classes, students are in permanent contact with the teacher, as well as during individual works, and/or in group works.

The teacher uses different ways of training, conversation, exchange of opinions asking students for their opinions on different topics, developed topics of common interest, using ppx. films and study visits to companies related to the CU subject. In addition to classic lessons, where the teacher exposes the subject, and/or the teacher tries to communicate with students and share their knowledge, there are other types of teaching applied to agricultural education students, such as:

Micro-lessons: Students prepare and present a topic during 20-30 minutes.

Study visits: Students visit companies from the Floriculture sector, fairs and participate in different seminars and congresses, where they can meet sector and industry representatives, learn from existing resources, and get ideas to implement in their future projects.

Active participation: Students learn and gain experience by participating in different projects: plant taxonomy, applying propagation methods, studying the needs that plants have for their development, scheduling crops; studying the installations and maintenance of the machines; managing the plantations inside and outside the greenhouses; performing lawn pruning, installation and maintenance practices; participating in rural and financial development projects and programs; developing time management skills, biotic and abiotic stress management, reconciling the maintenance of a personal life with professionalism; managing classes and preparing laboratory classes, promoting the school to the community, among other activities.

Student education in a classroom is managed, in part, by its native ability and prior preparation, but also by the compatibility of its learning style with the teacher's teaching style (Felder and Silverman, 1988). The age of the students (> 25 years) and the time of studying in higher education (5 years) allow them to show their ability to think positively with the material taught, showing critical thinking when necessary.

Students are rarely faced with the challenge of how this new and specialized knowledge fits into the context of the whole system, let alone the context of the agricultural enterprise. Furthermore, some students arrive at the school without a background in agriculture, compounded by organized training in isolated subjects in the secondary schools they attended.

Even most of the students who attend the CU of Floriculture and Landscape management, as a representative of the abovementioned BSc course, recognize the value that education in agriculture has for the improvement of Agriculture in Portugal. Being (or not) the farmer's son, they choose

agriculture as their professional choice and think that agriculture has a future in Portugal, recognizing the value of the course they attend, but accepting the challenge to enroll in a complementary education.

Students study to pass an exam and get a positive grade. They do not have the habit of creating own notebooks as a source for study. For this purpose, they use notes of the subject taught, personal or those from the colleague, mostly looking for copies that teacher provides.

It is more than obvious that the internet is today very present tool in the student's lives, not only to seek information about the subject of interest, but also to carry out a group work. Mainly in their reports, the copy-paste system is still present, which often deceives the student, who is convinced that the internet information (ex. using Google search) is a true and highly scientific source, which, unfortunately, is not always based on scientific/real findings or proves, and sometimes defined as "fake news".

It is impossible to use all the techniques during all lessons, but several, that are available, can be applied. In this way, a teaching style that, on one hand, is effective for students and comfortable for the teacher, will evolve naturally without problems, with no negative effect on the quality of teaching/learning (Felder and Silverman, 1988).

In the above described environment of the agricultural education system, herewith represented through Floriculture and Landscape management, and students' dissatisfaction with the topics and sequence of current courses, we are seeking for alternatives in our teaching system.

Conclusion

Preparing professionals to work in a highly competitive global market is a great challenge and motivator.

Although in Portugal higher education has been criticized for the lack of industry input in the training process, this input is extremely important due to rapid technological advances. Professionals from the floriculture industry argue, and the survey also points on it, that we as professors, are not adjusting enough the training to the industrial reality. In fact, collaboration with industry is very important.

Students need to demonstrate the ability to work in a team, show leadership skills, dedication, and initiative. They must have the opportunity to apply the science and practice they have learned in a class.

The floriculture curriculum should produce graduates who can "think globally, act creatively, value diversity, be responsible and interact cooperatively" (Trexler et al., 2003).

In this context, many university professors talk about the need to improve teaching, but few investigate it or do anything about it.

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