Perceptions of first- and second-year professors of University Professorship in Biology about the good undergraduate student

Percepciones de los y las docentes de primero y segundo año del Profesorado Universitario en Biología acerca del buen estudiante

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Abstract

The following paper aims to analyse the perceptions or images of a good university student and to identify the competences needed to be a good student, according to the implicit theories held by first and second year teachers of the University Teacher Training Course in Biology at the Faculty of Exact, Chemical and Natural Sciences of the National University of Misiones. The methodological approach of the research is mixed and of flexible design. The instruments used were the questionnaire and the interview. From the analysis of the data, it can be seen that the teachers consider that a good student should have transversal competences such as teamwork, autonomy and time organisation. They also mentioned study habits which would be related to causal and linear learning linked to direct and interpretative theory. For women and men, students possess instrumental and interpersonal transversal competences; men add systemic competences. The accompaniment strategies mentioned by the teachers coincide with their conception of learning.

Keywords: Good student; Competences; Implicit theories; University teaching staff in Biology.

Introduction

The objectives of this paper refer to the identification and analysis of the perceptions or images of a good university student, as well as the competences necessary to be a good student, according to the implicit theories held by the first and second year teachers of the University Professorship in Biology (PUB) of the Faculty of Exact, Chemical and Natural Sciences (FCEQyN) of the National University of Misiones (UNaM).

University entrance requires the construction of the notion of the student’s profession, which implies the acquisition of knowledge that goes beyond the curricular content of each degree course and is relevant to their performance as a university student. University education is a process through which each student builds “the
ability to recognise and effectively implement the norms and criteria of a field where the different capitals (social, cultural, educational) are unevenly distributed”. (Torres, 2013:145)(1). Mastering the profession of student implies “being able to mobilise, in context, a series of methods and practices necessary to fully carry out academic tasks” while, at the same time, being able to “integrate the values and norms of a predetermined environment and to play the social role expected by the institution and the actors in the system” (Cols, 2008, in ob. cit., 2013: 145) (1)(1). This domain involves cognitive work and an affective disposition that requires implicit skills in those entering this level of the education system.

Students entering university should possess certain indispensable skills and competences that will ensure their permanence and transit through their careers and institutions and, subsequently, in their working life.

Castañeda (2009, in Fernández Reina, Mijares Llamozas, Álvarez Castillo and León Pirela, 2015: 363) (2) defines academic skills as those that allow students to adapt and develop in the academic environment. For his part, Howard (2012, in ob.cit. 2015:363) (2) points out that these “are generic and transferable competences that underpin the development of university students’ learning, enabling them to be confident and independent, critical thinkers and reflective learners”.

Meanwhile, Argudín (2001:45) (3) defines “competences in education as the convergence between disciplinary knowledge, generic skills and the communication of ideas”. Competences include attitudes (being), knowledge (knowing) and metacognitive skills (learning), all considering performance within a common life and work context.

Navarro Abal (2009:191) (4) distinguishes “subject-specific competences and generic or transversal competences”. Specific competences are composed of theoretical knowledge (know-how), practical knowledge (skills) and attitudes. Generic or transversal competences are those necessary for professional practice. They are divided into instrumental, interpersonal and systemic, ranging from cognitive skills, methodological abilities, linguistic and social skills to the systemic understanding of reality.

Fernández Reina et al (2015: 364) (2) state that “...skills can be learned and developed naturally or intentionally through practice ..., with participation in various activities designed for this specific purpose or for others ...”

In relation to the perception of the good student, the words of Sagastizabal and Pidello (2012: 1) (5) are taken up, stating that “the representation of the good student is a construction that describes a behavioural role, but which has as a necessary referent a system of values from which it is defined as such”.

In the characterisations of what it is to “be a good student”, it is understood that gender also comes into play and could influence teachers’ perceptions. As suggested by Solano Gutiérrez and Campos Céspedes (2013: 4) (13) who mention the importance of “…considering value and anti-value systems that vary from one culture to another according to the functional characteristics of individuals such as age, gender, kinship, status and occupation”.

During their training or through experience, teachers acquire a large number of meanings in different aspects such as curriculum (content, skills, methodological guidelines, assessment guidelines) that have an impact on their practice. In reference to teaching and learning processes, it is relevant to consider the implicit or popular theories that make it possible to organise and predict the world on the basis of different pedagogical interpretations and that influence student learning.

Teachers’ implicit theories that operate in their practices are defined by Loo Morales, Olmos Roa and Granados Marguey (2003: 64) (6) as “personal pedagogical theories reconstructed on the basis of academic knowledge historically elaborated and transmitted through training and practice. They are a synthesis of cultural knowledge and personal experiences that make up the so-called practical thinking”. These conceptions, in the words of Pedreira Alvez and Pozo (2014: 193) (7) “…result from personal experience in front of the cultural environment of learning; it is something we feel, live and experience, and that is why they are difficult to be shared and modified”.

From the perspective of implicit theories in relation to learning, Vilanova, Mateos-Sanz and García (2011: 55) (8) describe them as the “set of representations of a non-concious nature that restrict both the way of facing and interpreting the different teaching and learning situations that a subject is confronted with”. In this regard, Pozo and Scheuer (2000) (9) propose three implicit theories: direct, interpretive and constructive conception. The direct conception assumes a linear correspondence between the conditions of learning and the results obtained, which means that with equal teaching, all students should learn the same thing. Learning is conceived as a fact, not as a process. The interpretative conception assumes an active learner, with memory activities, attention, associations and inferences being relevant for learning, without the need to be in direct contact with the object. It shares with the previous theory the idea that learning consists of reproducing information previously selected and presented by an expert.

Finally, the constructivist conception assumes that knowledge is the product of a construction process based on the interaction between the subject and the object. The emphasis is placed not so much on the final product to be learnt, but on the development of metacognitive capacities that allow different points of view to be analysed with respect to a particular object of study.
Methodology

The methodological approach of the research is mixed, combining quantitative and qualitative, and flexible in design (Vasilachis, 2009) (10). The instruments used were the questionnaire (Grasso, 2006) (11) and the interview (Taylor and Bodgan, 1987) (12). A questionnaire was developed and applied to the teachers who constitute the teaching teams (teachers and assistants) of the first and second year subjects. The mixed questionnaire combined open and closed questions with a Likert scale, completion items and case studies. One section of the questionnaire sought to investigate the perceptions or images that teachers have of good university students, looking in depth at the competences they consider they should possess and the implicit theories they hold.

In another section, a list of skills was included for teachers to indicate the skills they identify in students in the first years. The list was drawn up in accordance with the categories of competences mentioned above, including both specific and transversal competences. Namely: Specific competences (good command of theory and good practical skills); instrumental transversal competences: cognitive skills (comprehensive reading and note-taking), methodological skills (seeking information from reliable sources, problem-solving and decision-making) and language skills (good oral and written expression); interpersonal skills (development of scientific thinking, teamwork, discussion skills, conflict resolution and participation) and systemic skills (responsibility and creativity).

In addition, three open-ended items were formulated to recover teachers’ perceptions of the causes/characteristics that influence a student to obtain an adequate academic performance in the development of his/her subject, the factors that influence the trajectories of the students in his/her subject and the academic accompaniment strategies developed by the teachers, considering that these would configure the job of a good student.

The questionnaire was sent by email during the period October/2018 to October/2019 to 1st and 2nd year teachers. The curricular structure of the Study Plan Res. ME 1806/16 presents 11 curricular units for the 1st year and 8 for the 2nd year differentiated into four training fields: Specific Disciplinary, General, Pedagogical and Professional Teaching Practice. Responses were received from the teaching teams of 14 subjects. Among them are those of 11 teachers responsible for the subject and 7 assistants (5 Chief of Practical Works and 2 Assistants of 1st year) which results in a total of 18 responses corresponding to 12 women and 6 men. The sample represents the four training areas mentioned above.

Of the teachers, eight have between 1 and 5 years’ seniority, two between 6 and 10 years, one between 11 and 15 years, two between 16 and 20 years, one between 26 and 30 years and finally, four with 30 or more years of service. With regard to teacher training, only three mentioned not having any, although one (with a length of service of more than 30 years) highlighted her experience in the university classroom. Of the rest, seven have an undergraduate degree and six have a postgraduate degree. In addition, five are developing their teacher training with postgraduate studies. The remaining five have participated in various training courses related to the field of education (workshops, courses, meetings for the exchange of participatory learning experiences).

Six semi-structured interviews were conducted with five first-year teachers (Chemistry; Mathematics; Education, Society and the State; Socio-educational Practice and Biology) and two second-year teachers (Socio-institutional Practice and Plant Biology). The interview script was drawn up on the basis of the systematisation of data from the questionnaires, allowing us to examine particular aspects of some subjects in greater depth.

Results

What does being a good student mean to PUB teachers? When asked about the characteristics of a good student, the women mentioned specific competences related both to the discipline and to the methodology of science. The following testimonies are examples of this: “... through work in the laboratory, acquiring skills in the correct handling of optical, glass and biological material and incorporating the ability to handle laboratory instruments correctly, as well as problem-solving, inductive and/or deductive logic” (C15); “to question/reflect/problematise about the object of study, to seek conceptual and empirical references autonomously” (C7). They also consider transversal instrumental competences such as cognitive skills (interpretation and comprehension of the contents of academic scientific texts), methodological skills (problem solving using inductive and deductive logic, decision-making, learning strategies) and linguistic skills (oral and written communication, note-taking, ability to synthesise and organise information).

The teachers point out that “they must have the ability to study, understand scientific-academic texts, make syntheses and concept maps, recognise the main ideas of texts and achieve oral expression of the knowledge acquired” (C15); “responsible, dedicated during the course, showing interest (attendance at advisory classes, for example)” (C2); “those who carry out activities with responsibility, commitment and perseverance. To do this: they take notes, read books, do exercises, consult, organise their time, prioritise activities” (C3); “they know how to search for information in reliable sources” (E6); “competences to know how to read and understand” (E3); “they know how to debate, make proposals” (E5).
Among the interpersonal competences such as training in values, critical attitude, ability to discuss, socialisation, solidarity, openness and participation in social and political activities, the teachers point out that the students must have training in values and attitudes; ... perseverance and a critical attitude for decision making and open to change/improve their own learning process” (C9); “distracts their mind by doing other actions such as playing sports, socialising, among others” (C3); “supportive and respectful of their classmates and teachers. Predisposed to teamwork” (C4); “think in collective terms beyond discipline” (E4).

The systemic competences mentioned relate to motivation for studying and learning, interest in knowledge and creativity. The teachers express: “one who has already developed an interest in knowledge, is used to thinking and thinks for himself” (C6); “those who understand that the main actor in his learning is himself...” (C6), “those who understand that the main actor in their learning is themselves...” (C10), “they dedicate time to study and throughout their studies they look for learning strategies that are optimal for them”. I consider that the student’s vocation and creativity are fundamental aspects in this process” (C8); “those who are motivated to learn, search for themselves” (E1); “they are committed to their training and study” (E2); “autonomous” (E1 and 6). In the teachers’ expressions, it can be identified that conceptions of learning related to direct and interpretative theories appear with greater assiduity.

In the case of men, they list specific competences related to the contents of Biology and its teaching. In the words of one teacher, “one who becomes a “student” means that he or she is passionate about knowledge, about asking questions, about wanting to know more about the teacher’s work, about the specific concepts of biology and didactics for teaching” (C11).

Within the instrumental transversal skills, they cite methodological skills such as study habits, knowing how to plan, make adjustments and evaluate results, and as for technological skills, they refer to the use of computer resources.

One teacher says that “a person who attends class and has a daily study habit, plans a study schedule and uses current computer resources in a complementary way” (C13). Among the interpersonal skills, they list the ability to listen, participate, and relate to their peers. The teachers express “being responsible when working in a group” (C13); “…knowing how to work moderately well in a team, being responsible and versatile to adapt to different ways of working” (C11). In the systemic ones, there is special interest in knowledge and passion for knowledge, autonomy, tolerance of failure, flexibility to adapt to different ways of working and thinking.

The following testimonies refer to “develop an interest in knowledge” (C12); “…be able to accept failures and seek to learn from them, with the ability to listen” (C11); “one who achieves his proposed goal of obtaining a university degree (knows what he is at university for), undergoes a learning process that goes beyond his professional training, in which he develops a life of integrity in his relationship with his peers” (C14).

In the men’s expressions, as in the women’s, the conception of learning would be related to the direct and interpretative theories.

From the comparative analysis of the competences and skills expressed by both genders, the transversal ones stand out, including interpersonal (teamwork), systemic (autonomy) and instrumental (methodological skills such as time organisation and planning). This analysis is similar to that expressed by De la Cruz (2003 in García Ruiz, 2006: 256-257) (14) on the characteristics of university students “highlighting their active role in learning, their autonomous nature in the search for information and in the generation of new knowledge, their capacity for reflection, for applying appropriate strategies in the resolution of problems and difficulties that may arise, their cooperative nature and their sense of responsibility that accompanies them in all facets of learning”.

The teachers’ expressions do not show significant differences that indicate the prioritisation of one type of competence over another when seniority and the fields of training to which their subjects belong are analysed.

It is possible to recognise that within the “occupational hazard”, teachers mention study habits that are characteristic of the direct and interpretative conceptions as being: attendance at the theoretical-colloquium classes; active participation in the laboratory group; participation in class; solving the problems in the colloquium guide or integrating exercises; keeping up to date with the reading of the theoretical bibliography; reading the study material provided by the department; daily or weekly practice of exercises; taking notes; consulting about their doubts; using appropriate sources of information; having information on the subject programme and understanding how it fits in with the degree programme; time organisation; planning.

They also state attitudes that are difficult to evaluate and linked to personal experience, such as: perseverance; dedication; patience; creativity; commitment; responsibility and discipline. Complex cognitive processes are mentioned: comprehensive study integrating theoretical knowledge with real material presented in the laboratory; enquiry; research; critical thinking; problem solving; autonomous search for problem-solving processes; theory-practice relationship; relationship between theory and real-life situations; ability to read and make concept maps; ability to relate content and comprehensive reading of reliable sources.

In some cases, teachers add actions linked to working with others: incorporating collaborative capacity for laboratory work; working in groups; teamwork;
collaborative work.

From the analytical reading, it can be inferred that the majority of teachers respond - with important nuances - to the widespread idea that teaching and learning is a causal and linear process linked to direct and interpretative theory. Only four teachers (three women and one man) would interpret teaching practices as a social practice, in which teaching and learning are two processes that feed back on each other, associated with constructivist theory where there is a shared responsibility in the development of the student’s job.

It would be necessary to analyse the numerous conditions that would determine a good student: procedures, attitudes, study habits, ways of working with others, which sometimes result in confusing and ambiguous messages, since each teacher appeals to his or her own traces as a student to generate these expectations on the student body. As expressed by Edelstein (2014:22) (15), “educators are also beings with a past, with a history in which we root our professional projects”.

What competences and skills do PUB teachers recognise?

When the teachers were consulted about the skills and competences they identified in the students of 1st and 2nd year, it can be observed that most of them recognise transversal competences and, to a lesser extent, specific competences (Figure 1).

![Figure 1: Skills of students in the 1st and 2nd years of PUB recognised by teachers.](image)

A detailed analysis of Figure 1 shows that most of the teachers recognise interpersonal transversal competences such as working in a team (78%) and being participative (74%). Meanwhile, 42% mention that they know how to discuss and a minority group (26%) that they are able to resolve conflicts.

Among the cross-cutting instrumental skills, 68% recognise the ability to take notes and 21% consider that they have good oral and written expression, half identify cognitive skills such as reading comprehensively and developing critical thinking. Similar percentages (around 45%) mention methodological skills such as decision-making and problem-solving.

In terms of systemic competences, half of them recognise that they are responsible and creative. And with regard to specific competences, 47% emphasise that students seek information from reliable sources, 18% that they have a good command of theory and 11% that they have practical skills.

When comparing the competences recognised by the teachers, no differences are observed according to the areas, except that in the fields of General Training and Pedagogical Training they do not refer to specific competences.

In line with Solano Gutiérrez and Campos Cespedes (2013) (13), the skills identified by gender are analysed and compared, as shown in Figure 2. It should be remembered that the sample consisted of 12 women and 6 men who were analyzed independently.

![Figure 2: Skills identified in 1st and 2nd year students.](image)

The skills recurrently identified by women are located within the transversal instrumental (cognitive and linguistic) and interpersonal competences: reading comprehensively (75%), taking notes (83%), developing critical thinking (75%), working in a team (100%) and being participative (75%).

Meanwhile, men indicate transversal instrumental, interpersonal and systemic competences: taking notes (67%), working in a team (67%), being participative (83%) and creative (67%).

In lower percentages, although in an approximate manner between women and men, they indicate two instrumental competences associated with methodological skills: seeking information from reliable sources (58%-50% respectively) and solving problems (58%-50%) and one of an interpersonal type: knowing how to discuss (50%-50%). In turn, both genders (33%) coincide in recognising the methodological capacity for decision-making. Finally, although the difference in the percentage of identification between women and men widens, proximity is observed in terms of two systemic transversal competences: responsibility (67%-50%) and creativity (50%-67%). 25% of women recognise specific competences such as a good command of practice and theory. The latter is also identified by one male (17%). All of them belong to
disciplinary training.

When comparing the competences that students should possess according to female and male teachers and those they recognise in students, it can be seen that female teachers identify some transversal competences centred on the cognitive instrumental and linguistic aspects, although they consider that a good student should possess specific and transversal competences. Meanwhile, men observe instrumental cognitive, interpersonal and systemic competences, whereas for them a good student must possess specific, instrumental methodological, interpersonal and systemic competences.

When inquiring about the didactic strategies proposed by the teachers for accompanying students and which would enable the development of skills and competences, those that favour motivation, participation and understanding are highlighted.

Among the strategies that promote motivation, they mention:
- Case studies, research work that motivates students to attend theory classes (C10).
- Prior reading that allows the student to have notions in order to be able to ask questions when developing an explanatory class of contents (C13).
- Maintaining a constant curiosity on the part of the student, using triggers that respond to the what, how, why and what for of cellular processes; the contribution of students (others would understand this as an interruption of their class) is fundamental, as it increases collective self-esteem based on the joint construction of knowledge (C14).
- Working with problem-solving situations that put students in a position to solve, commit to and get involved with the task (C9).

Among those that promote participation are the following:
- Theoretical classes that encourage the contribution of students, with the incorporation of group work and issues that open the game to debate and questions (C8).
- Dialogue with students so that they are encouraged to express what they think, what could be improved or what is not explained in the classes. (C9).
- Getting students to participate with questions referring to previous knowledge of topics from other subjects or from previous classes (C15).
- Designing and implementing activities that include basic academic technological content (C11).
- Incorporating the use of visual tools to guide them during the development of the subject, such as following a synoptic table or using graphs (C15).
- Guidance in the resolution of the proposed classroom practical work (group work) (E3).
- Group reading in the classroom and collaborative problem solving. In one interview, a strategy proposed for the first year was mentioned: “and in theory what I do is to pose a paragraph and sometimes I ask them to give a definition, to see what we get out of it” (E4).

To conclude, in terms of the importance of implicit theories in teaching and learning, it can be seen that the accompaniment strategies mostly respond to direct conceptions and some to interpretative ones, promoting particular meanings and configuring a system of values that operate in the development of the university student’s job.

Conclusions

In reference to the analysis carried out on the perceptions and images possessed by teachers of the first and second year of the PUB about the good university student, it is evident that women consider that they must have specific competences related to the discipline and to the methodology of science, instrumental transversal skills such as cognitive, methodological and linguistic skills. In addition, they cite interpersonal competences (values, attitudes, social and political participation) and systemic competences (motivation, interest in knowledge and creativity).

Meanwhile, males list specific competences related to the contents of Biology and its teaching. Among the instrumental competences, they mention methodological and technological skills; among the interpersonal competences, they highlight the ability to listen and the relationship with their peers; and among the systemic competences, interest in knowledge, tolerance of failure and flexibility. If we compare the competences and skills shown by men and women, the transversal competences and skills stand out, including interpersonal (teamwork), systemic (autonomy) and instrumental (organisation of time and planning).

No significant differences are observed that indicate the prioritisation of one type of competence over another according to the age and the fields of training to which their subjects belong.

In terms of the “occupational hazard” of a good student, most teachers mention study habits, which would be related to the widespread idea that teaching and learning is a causal and linear process linked to direct and interpretative theory. On the other hand, a small number of teachers interpret teaching and learning as two processes that feed back on each other, associated with constructivist theory, where there is a shared responsibility in the development of the student’s job.

With regard to the skills that the teachers identify in the PUB students, the transversal instrumental and interpersonal competences are found, with no differences existing in the subjects in the areas of specific disciplinary training and Professional Teaching Practice. Males also include systemic competences.
The didactic strategies of accompaniment that the first and second year PUB teachers say they implement are those that promote motivation, which would enable the development of systemic and instrumental skills; participation, which would promote interpersonal and instrumental skills; and understanding, which would encourage the development of specific cognitive and instrumental skills. In reference to the theories implicit in teaching and learning, it is inferred that these respond mostly to direct conceptions and, to a lesser extent, to interpretative ones.

References