

Alexis Tejedor De León, e- mail: [atejedor@cwpanama.net](mailto:atejedor@cwpanama.net)

*The Game of Knowledge: A ludic and effective form of co-construction of significant learning within the collectivity of a university*

## **The Game of Knowledge: a ludic and effective form of co-construction of significant learning within the collectivity of a university**

**Alexis Tejedor De León**

Universidad Tecnológica de Panamá – Centro Regional de Veraguas – Depto de Materiales y Metalurgia -San Antonio – Atalaya [www.utp.ac.pa](http://www.utp.ac.pa)  
e-mails: [Alexis.Tejedor@utp.ac.pa](mailto:Alexis.Tejedor@utp.ac.pa) [atejedor@cwpanama.net](mailto:atejedor@cwpanama.net)

**Abstract.** *Some elements that constitute the dynamic of interaction between student-teacher and/or student-student in a classroom are the basis of the teaching-learning process. The Game of Knowledge (GK) was used as an effective form of co-construction of significant learning at the university level; likewise, it is constituted as a motivational strategy. Data was collected through semi-structured, in-depth qualitative surveys and personal interviews with all the students. The information obtained gave us the evidence that students internalized, not only the programmatic contents developed, but also all the given aspects related to the university dynamics such as disciplinary processes and metacognitive strategies of the teaching-learning process in science and technology.*

**Keywords:** significant learning, dynamic game, co-construction, reflective practice, flexible teaching and learning.

### **1. Introduction**

Students choose to obtain a degree in engineering at the university for a variety of reasons determined by their aspirations, ability, and/or availability at university (Leow, Marcus, Zanutto and Boruch, 2004). In fact, an important dimension of quality in higher education is the quality of the outcomes achieved (Warn and Tranter, 2001).

In the absence of formal preparation for teaching in the higher education context, faculty commonly learn by experience, reflection on that experience, and some form of mentoring. Faculty development programmes have traditionally focused on “how to” teach; that is, on techniques and tips conveyed in workshops or through individual consultations that have been reported by several authors (Roush, 1983; Walkington, Christensen and Kock, 2001; Cranton and Carusetta, 2002; Clarke and Jarvis-Selinger, 2004; Berger, Boles and Troen, 2005). So far, the number of these studies is rather small.

The mission statements of most colleges and universities include the goals of lifelong learning, critical thinking, autonomy, and student empowerment; in this practicum setting, the educational process should not be converted into an only proposition of tautological concepts (Rodrigues, 2001).

Nevertheless, in this context, occasionally the university teaching becomes a secretive profession. The classroom remains a private space where colleagues rarely drop in to observe or share methods and strategies about teaching that will guarantee increased student learning and cooperative learning abilities (Shia, Howard and McGee, 1997). Accordingly, Craton and Carusetta (2002) explain that teaching is a specialized form of communication with the ultimate goal of fostering student learning to acquire first-rate knowledge.

Although Dewey (cited by Walginton, Christensen and Kock, 2001) is acknowledged as the initiator of reflective practice, there has recently been renewed support for concepts identified as “teacher as learner,” “teacher as researcher,” and “teacher as reflective practitioner.” As a matter of fact, teachers are never experts: they continue to learn and adapt their practice to meet the needs of all stakeholders in the educational experience.

But the main question is still “How to teach?”. This has been a major issue in the debate on how to raise standards in education. Despite these comments, the best teachers tend to be those who think

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about what they want to accomplish, how they are going to accomplish it, why they want students to learn it, and how they will know students have learned it. Recently, the studies carried out by Berger, Boles and Troen (2005) explore contrasting views of several kinds of teachers, and considered that the “teacher as researcher” report learning more about their students, their schools and themselves, because they use this knowledge to change their practice, to feel more professional, and to engage authentically with the profession of teaching in a new way. For instance, from this perspective, the learning process is viewed as a collaboration between academic staff and student, in which the instructor develops students’ competencies and critical thinking through the use of active learning methods that contribute to the formation of student identity .(Macintyre and Ireson, 2002; Zhang, 2004; Haavisto and Lehto, 2004).

The beliefs, actions, motivations, and intentions in relation to the manner in which one conceives the context of learning is known as a teaching perspective (Pratt, cited by Clarke and Jarvis –Selinger, 2005). In the context of engineering and technology education, emerged the “flexible teaching and learning” that provides a new and dynamic context for teaching and learning (Chapman and Pyvis, 2005). In accordance with Palmer (2001), flexible teaching and learning refers to an approach to education designed and conducted on the conviction that education is a recurrent, lifelong process, centered on the learner and the learner’s ability to make choices about the way learning occurs.

Based on a model of flexible teaching and learning, the purpose of this study was to examine the experiences of the author in applying an active learning method for making teaching culture in engineering and technology more intuitive and meaningful in the context of students as active discoverers and creators of their knowledge. More specifically, the aim of this work is to discuss some elements that constitute the Game of Knowledge’s dynamic in the co-construction process of appropriation of significant learning and to promote a cooperative learning at a higher education level.

The Game of Knowledge is based on cognitive activity sorts. This methodology has proven to be useful in teaching diagnosis and emphasizing various types of learning.

We undertook this study – as generally is the case – based not only on our previous research, but on our previous experience as “teachers as researchers” (Tejedor, 1997). Each of us has been involved in some form of teacher research for several years, and have experience as instructors of higher education.

## **2. Method**

### **2.1. Participants**

Our research methodology followed a case study approach where we explored the nature of teaching within a bounded context. This study was carried out in two parts. The Centro Regional de Veraguas at the Universidad Tecnológica de Panamá was our unit of analysis; we used a phenomenological perspective because we studied the experience of working within a group of 40 students who described and interpreted their experience.

We began as early as possible in the middle of the semester (in June) with two groups of participants. One group consisted of 16 students taking a mechanical engineering course while the other group was comprised of 24 students enrolled in mechanical technical studies.

### **2.2. Procedure**

The first part of the study was a document review and it consisted of programmed information that outlined objectives, teaching schedule, outcomes, assessment guidelines and faculty policies for the courses from which the participants were selected. This selection was done prior to the introduction of

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the rules of GK. Secondly, standardized questions about a particular topic was undertaken within the classroom and made to a randomized student; thus, allowing comparison of achievement across groups. The GK was carried out with all the students present in classes.

The structure of GKs' methodology was drawn and presented in Figure 1. At the beginning of an academic period the instructor explains the fundamentals and basis of the Game of Knowledge.

Taking into consideration the subjects taught in each lecture, the facilitator randomly selects a student to answer a given question. The selected student may choose to participate or not in the game. If the student chooses to participate, the "rules of the game" will be used.

Every question formulated by the facilitator has a value of 5 points, if the student answers correctly. If the question is complex, the facilitator may double its value, and will communicate that to the student.

The student will play until he/she fails to answer a question or resorts to the "aids" provided by the game. These aids are the following: (a) Pass the question: where the facilitator will ask another question. (b) Ask for help from another student: where the player can select or ask the facilitator to select another person. In the latter case, the facilitator will randomly select another student. However, a student selected as an aid cannot be used in that facility again by any other student during the current game. (c) Go to the deck of cards: where the facilitator will answer the question following the results of a card drawn. There are 4 cards with the following meanings: 0 (the facilitator does not answer the question), 1 (the facilitator provides the correct answer), 2 (the facilitator provides 2 answers but only one is correct. The student must then choose one of the answers), 3 (similar to the previous case, but now 3 possible answers are provided to the student).

Throughout the game, if the student fails to answer correctly, even using one of the "aids" provided, the points are discounted from the points previously obtained. On the other hand, correct answers will be used to improve the student's grades earned in a previous exam or quiz.

In accordance with responses, the student who providing successively "correct" answer to ensure continued involvement in playing students. In a given moment, a student that has answer correctly to a series of questions and has accumulated a sufficient number of points may be challenged by the facilitator for an all or nothing game. If the student chooses to continue, a last question will be formulated: if the student answers correctly he/she may skip a quiz or partial exam, if he/she fails, will lose all the accumulated points; this is the total risk model.

In this study the data was collected through semi-structured, in-depth qualitative surveys and personal interviews with all the students from each group. These instruments were developed to determine the following aspects of participants' perspectives: their aims and intentions with regard to choosing or not to play GK; the kind of strategies and aids used to achieve those aims, and the reasons they give to reach more a specific learning by playing GK.

### **3. Results and discussion.**

The studies reported in this paper offer insight into student experience of their learning study through "playing" and sharing in cooperative learning. The analytical framework for each group was to explore the impact of the kind of help, given by the GK in the acquisition and the formation of significant learning; and in other hand, to find the reasons for choosing or not to enroll in this particular teaching strategy. Most of the students surveyed weren't familiar with a variety of teaching styles. They also considered that the using a non traditional style provided opportunities to take control over their own learning. This is achieved through a rational decision making process, taking account the number of correct responses provided. While there were many interesting features of the analysis that caught our attention, we focus solely on those areas for which frequency was significant. In both group,

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more than 73% of students chose to play the GK by the conviction to share their prior knowledge within a particular topic, with their classmates. In line with the expectation of playing students, students expected the quality of their learning. Figure 2 shows the reasons' frequency for choosing to be playing students.

As a shown, students were attracted to participate in GK for reasons that included the curiosity about the game (30%), the anticipated opportunities to improve previous evaluation of themselves (66%). As one student said "recognition of the score that could be obtained was an important factor in the choice of play GK". Another reason point out for choosing GK was to engage in academic interaction with their peers (55%), to have the freedom to voice opinions, to experience "foreign" learning and teaching styles and to adopt other approaches to learning (40%) - changing perceptions of student development; and the same time to grow as an individual. In addition, students sought to learn as playing students was a key strategy to organizing not only their studies, but also the opportunity to act as rational and strategic decision makers.

The results from this study suggest that are some prevalence of score obtained perspective among cooperative learning perspective and speaks to an interesting dynamic within the cooperating students' population. The adoption of this perspective in our pedagogical interaction with student augurs well for those who argue that the relationship between teacher and student is one of the most critical elements of the class environment. Even though students knew well the methodology of the GK, very low percentages of students (4.4%) avoided being a playing students, primarily afraid to be questioned in a public setting, . However, the result is particularly alarming for those who see teaching and teaching education as a vehicle for social change. In order to compare learning aids used during the GK some interviews were made. The information analyzed revealed that more than 85% of students prefer peer support, regardless if he/she was selected by the player or by the instructor. This observation underscores the need for more collaborative and cooperative learning among peers in the classroom.

Regarding the questions used during the implementation of the GK, 65% of the students considered them valuable (48% claimed it help them to remember things they had already forgotten and 52% to understand better the topics that had been previously discussed in class). Regarding the dynamic nature of the GK, more than 90% of the surveyed students considered the experience as good or excellent. Finally, as has been pointed out previously, most students said that the possibility of improving their grade and the points obtained were important to improve their partial evaluation.

#### **4. Conclusions.**

The studies described in the present paper allow us to make some contributions:

- First, this paper has demonstrated that one of the most important results from this study is the prevalence and validity of the GK as a model of flexible teaching and learning. The GK, as an innovative teaching technique, was received by the student body with some degree of fear and reservation. This "abnormal" behavior was minimized when discussing the rules of the game and the advantages of a more dynamic participation of them in the learning process.
- The main objective of the GK always must be to encourage an environment of collaborative learning with the co-construction of knowledge. In our experience, the students are at the beginning more interested in improving their grades than to enhance their knowledge, however with the proper steering by the facilitator a more dynamic and collaborative environment can be created.
- A cautionary note is in order here with respect to the danger associated with teachers adopting any single teaching methodology to the exclusion of all other strategies. One of the

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limitations of GK is the time used in class administration: when given the time to think about a response might well be at variance with the student actually do in the immediacy of the action setting.

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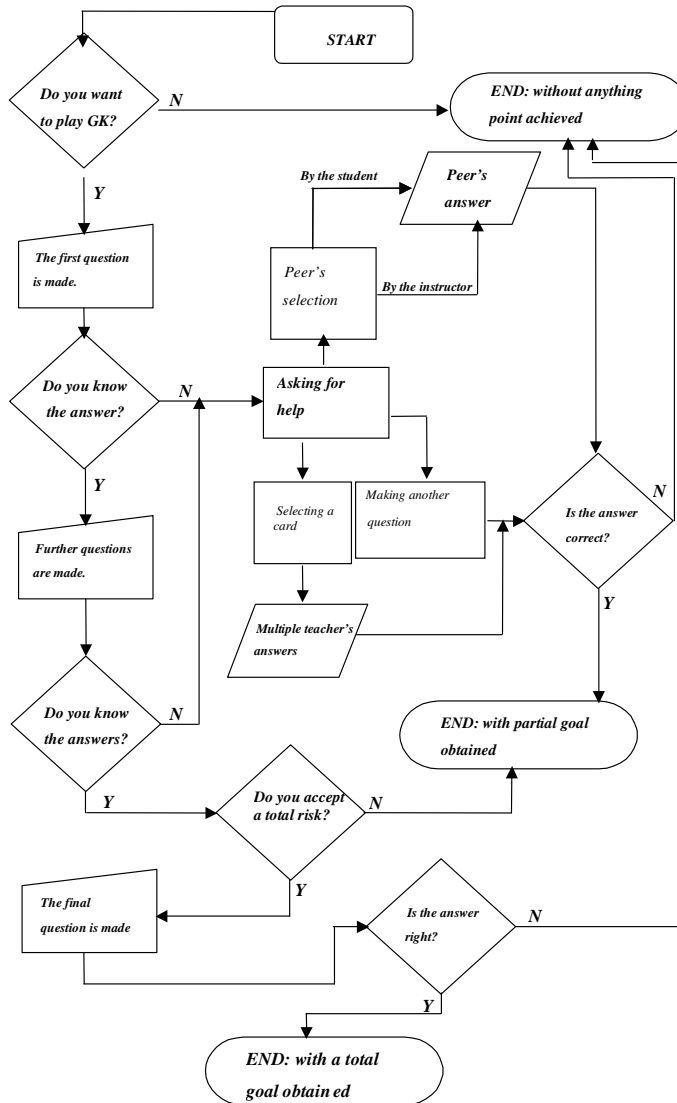
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Figure 1. Diagram of methodology carried out in this study

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Figure 2. Reasons for choosing to enroll to be playing students of GK

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