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# Learning as a Fuzzy Structure: New Challenges for Educational Evaluation

**José A. González C. & Ronald A. Manríquez P.***

**Abstract**: Recognizing the inability to accurately measure learning, we propose a new quantification tool. We understand the quantification of learning as a fuzzy structure; this is more general than the conventional quantification. This concept opens up new lines of research, analysis and modeling. It is an additional step in understanding the phenomenon of learning.

*Keywords:* Fuzzy structure; quantification of learning; evaluation.

The fuzzy set theory provides a mathematical treatment to some vague linguistic terms, such as ``about'', ``around'', ``close'', ``short'', among others. If the height of an individual is measured, a numeric value is registered including some inaccuracies. Such inaccuracies may have been originated by the measurement instruments, human limitations, biased prior information among many others causes. If the ``real'' value of the height is represented by the number $h$, maybe it would be more correct to say that the value of the height is approximately and not exactly $h$ (Barros, 2010). As proposed by Coppi et al. (2006), the fuzzy theory may provide an additional value to the statistical methods, due to the uncertainty inherent to the observable world and its associated information sources are combined beyond the traditional probability theory.

On the other hand to understand the learning process, several mechanisms or methodologies have been proposed, which seek to quantify learning , where it is set out that to measure learning it must be considered as a dynamic system constantly interacting with different realities. If in a concrete way there is already imprecision on measures, it is likely to be even more imprecise with this condition or typical element from abstract nature of man.

Therefore, it is to recognize the impossibility of measuring with precision, learning, problem is far from being resolved by conventional models. Therefore, we propose to conceive is the quantification of learning as a fuzzy structure.

## Literature Review

In the understanding process of the learning phenomenon, it is possible to distinguish a varied range of proposals. González et al (2010) proposed a mathematical-statistical methodology, in which the answering time to a stimulus is considered as a significant information element in order to know whether the learning structure is consistent or not. Fernández (1997) proposed the normal distributional model, as a representative, almost as a rule, from the learning process, however, this might be obsolete under the new projections of statistical modeling. Arellano-Valle (2005) reported that the data or the measures are those that have to give their model and also those in which the researcher does not have to force them to assume a determined behavior, leaving aside the symmetry assumptions and infinity supports. González (2012), based on Ojeda (2003), proposed to recognize the dynamic and interacting nature of a person and make it part of a model which considers to recognize these features, but on the basis of precise measures

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depending on the scores from a test. Nevertheless, Crombach (1951), indicated that a test is subject to reliability and validity which, evidently, strongly weakens the basis of measures precision, as an alternative to improve validity and reliability. García (2002) proposes a hermeneutic perspective, but it is just an improvement of those methods.

The perspective of learning as a fuzzy unit, has a lack of bibliographic references, and it is null in the specific educational area. However, this may have interesting applications in the learning tools or supervised learning (Soto 2011). Acampora (2010), who used the fuzzy view in the theory of system decisions, reported another potential use of this. Another interesting research regarding this growing methodology can be found in Barros (2010).

**Objectives**

Recognizing the incapability of measuring learning precisely and the continuous seek of general measurements methodologies, which allow to join co-variables and determining the significance of their effects, the problem of our research is: "to propose a methodology of a quantum representation of learning, which represents in an integral way a measurement based on the fuzzy numerical structures". Objectives are

- To present theoretical elements of fuzzy sets.
- To promote a quantum methodologies more general and consistent with the nature of learning.
- To promote a line of research based on the conception of learning as a fuzzy structure.

**Some Preliminary Analysis.**

The methodology is propositional, aiming to beginning a new line of research to understanding the learning phenomenon.

**The Concept of Statistical Model.** Statistical models have been used in a wide range of situations. For example, to solve specific problems in engineering and different scientific areas, and constitute the basis of the theoretical formulation of inference and most of the statistical methods (Arellano-Valle, 2005: 93-94). Nowadays, statistical modeling has methodological and technological backups that give a great viability for an educational development in modeling. A statistical model is a platonic conception of theoretical that, in a very generic way, can be seen as a mental constructor that aims to study and better understand a phenomenon in which a cause and effect relationship underlies (Ojeda 2003: 71-72). Understanding this section is essential to understand the meaning of this work, since one of the main objectives of education is to understand the phenomenon of learning, this phenomenon has an ideal model that perfectly explains this. However, in the process of proposing models, it should be increasingly considered characteristic elements corresponding to data we observe. In this sense, a proposal which can be used in the children quantification learning process, incorporating a suppose which represents nature's learning and its measurement.

**The Concept of Fuzzy Number.** A fuzzy number is a numerical structure different from the generally used. This is specifically characterized by the incompletion of two typical characteristics of the Geog Cantor Set Theory, which are the contradiction law and the principle of the excluded third. Which set, if $A$ is a set contained in a universal set $U$, thus $A \cap A^c \neq \phi$ and $A \cup A^c \neq U$, respectively. The unfulfillment of these two laws escape from our true or false logical system (Hailperin, 1986), because this perspective leads to degrees of veracity or falseness, that is we do not only have two characterization alternatives of a preposition, but also an infinite set of possibilities. To see these structures in depth see Arabpour and Tata (2008),

Formally, a fuzzy set is a collection of ordered pairs, say (x; F(x)) where the first component x represents a real number (x in IR) and the second component F(x) represents a defined function in x,

which assumes values in the unitary interval [0,1] (0≤F(x)≤1). This function F(x) is called membership function and it is used to quantify the belonging degree or veracity of the observed $x$ value. Note that in the Aristotelian logic there exist only two truth values, that is, a proposal is true or, in an exclusive way, it is false. In that case, the membership function would only generate two values: one or zero, and it is known as a characteristic function. Therefore, a fuzzy set is a generalization of the Cantor Set Theory and of the Aristotelian logic (Bradford 2011).

The fuzzy set theory is based on the logical of multiple values. For example, if the set $B=\{1,2,3,4\}$ is a conventional set, each element has the same belonging degree to the B set, which means that $F(x)=1$; for all $x \in B$. Now, the difference with a fuzzy set $A$ is that not necessarily F(x) = 1, considering $x \in B$. Other examples and technical developments can be found in Barros, 2010.

As a particular situation for fuzzy sets, Hwang (2011) and Dubois (1980) define the concept of normal fuzzy set which they called fuzzy number. The characterization of this particularity proposes that if there exists a unique par of the form $(x, 1)$, that is if only a pair of values which constitutes the fuzzy set, has as a value in membership the real number 1, then that fuzzy set is a fuzzy number.

In our initial proposal, we will assume that the quantum observations of the measurement learning process, are fuzzy numbers, existing an $x$ which satisfies F(x)=1. Which relates the traditional methodology of learning numerical quantification with our purpose.

A fuzzy number is modeled by

$$A(x)=\begin{cases} L\left(\dfrac{m-x}{\alpha}\right): x \le m \\ R\left(\dfrac{x-m}{\beta}\right): x \ge m \end{cases}$$

where $m$ is called center value of the fuzzy number $A$ and, $\alpha$ and $\beta$ are called left and right propagation, respectively. From now on, we will represent a fuzzy number as $A=(\alpha,m,\beta)_{LR}$ where the subscript LR indicates that we must consider the form of the membership function to the left and the right of $m$. As a particular situation, if $\alpha = \beta$, then the fuzzy number $A=(\alpha,m,\beta)_{LR}$ will be called symmetric fuzzy number (Zimmermann, 1996).

**Graphical Representation of the Membership Function**. *In figure 1, some basic graphic forms of membership are presented, although nowadays it is been working on increasing this alternative number of modeling. In curve 1 of figure 1, it is observed that the decrease of the belonging degrees from neighboring elements to the observed value slowly decrease, which it does not happen in curve 2. Curve 3 it is considered as the simplest situation and it is generally used for its simplicity of calculus, on it the decrease of the belonging degrees is lineal. This membership function is known as triangular and in this particular case is symmetric triangular.* Curve 4 has the intention of visualizing a conventional set, whit all the elements having the same veracity or belonging degree.

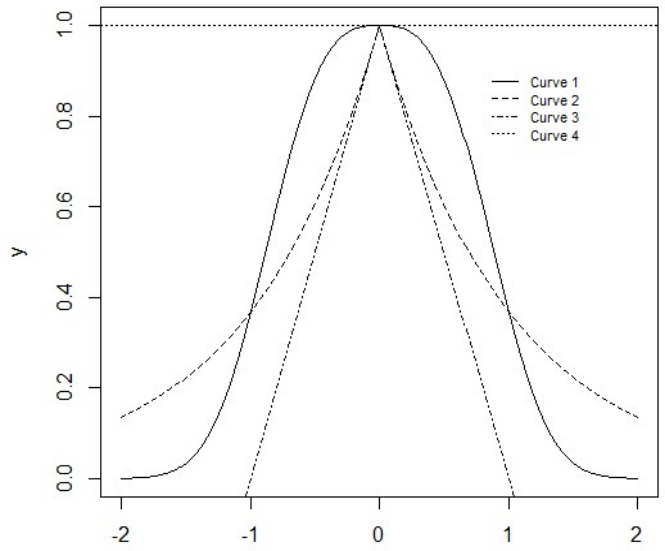



Figure 1: Graphical representation of the membership function.

**Learning Quantifıcation Based on the Numerical Fuzzy Structures**

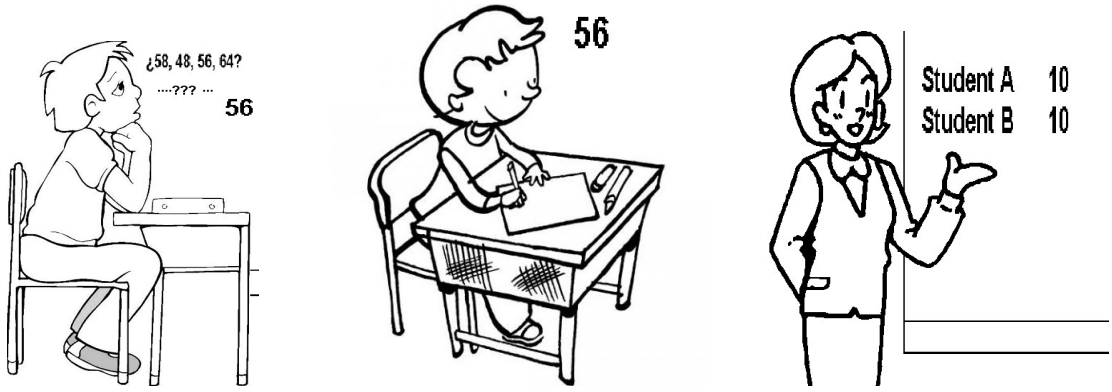
A subset of real numbers is generally used to quantify learning. The traditionally used learning quantification, is a process which tries to objectify the measure and make them comparable. However, it is worth considering, will this numerical label quantify learning in a precise way? The answer is no, because measurement or quantification processes are generally associated to tests whose reliability and validity are questionable. On the other hand, accuracy brings the concept of stability, that is, learning quantification would not vary among tests, however, it varies in a same content. Hence, it is necessary to propose methodologies which help to improve this process, which does not mean changing all this theoretical developments but to incorporate other relevant information in the measurement process. In González et al. (2010) is proposed that it is not sufficient to quantify whether an answer was correct or not, but there is also a temporary factor which is affecting the answer consistency, which is called by them as answering time for a stimulus. So, summarizing all the teaching and learning process is a quantum symbol, it is a mathematic-statistical methodology which in many times can be malign and overwhelming. All this, does not mean that real numbers are not a good methodology or a bad procedure, but it is still very far from the real representation of the complex system which is learning measurement. That is why we believe that evaluating mechanisms must open to new structures which combine traditional information of a real number and additional information which enrich the measurement.

When a student takes a test, and specifically a question, it is not only the correct answer the one that is in their cognitive structures, but there are many answers competing and it is the student who, as part of the learning and teaching process, must differ and chose one. As an example, In a simple experiment would be done with 100 students, where they are asked to ''automatically answer how much is it 7 multiplied by 8'', it is interesting to observe that a high percentage answer a different amount of 56, which it does not mean that they do not know but, they need more time to discriminate. That is, there are some other values that belong to this possibilities of answers but is, a reflection and induction which inducts them to their answer. That is the way the students generates in their cognitive structures set of possible

answers where each element of that set starts acquiring veracity degrees while they make the reasoning process. It is precisely in this process where an answer is selected as real, that is, the answer the students consider as correct.

In this context fuzzy structures have the property of modeling all this dynamic, where if it is contextualized we have, the membership function characterized in section 5.3, models the behavior of the veracity degrees from those possible answers generated by the student at the moment of the test, which will be technically identified as belonging group and all those answers which have as a belonging group 1 or equivalently 100% of veracity for the students, are the ones we observe.

For example, let is suppose a student A presented difficulties when giving his or her answer, checking it many times, this means that it exited a set of possible answers which belonging degrees were high and they were competing to become the real student's answer. In that case, the membership function presented in Curve 1 from figure 1 would better represent this context. Now, let's suppose a student B, who is confident when selecting an answer, and also does not have doubts on its veracity degree, the membership function which best represents this process can be observed in curves 2 or 3, where it can be shown that the veracity degrees of other possible answers strongly decrease. This quantum process turns out to be quite informative and interesting, because the students A and B's situations, do not mention that the answer they gave has been correct but they do mention the structuring of the answer selection model. It is interesting to consider what it means a student on situation B when his or her answer has been incorrect, for it can be the reflection of a solid conceptual structure but mistaken. This means that the student understood the concept and its conceptual logic is consistent to him, but in a wrong way. For student A's case, giving a wrong answer can represent a maximum lack of understanding. So, to go in depth regarding fuzzy structures, their numerical effectiveness and mathematical formalization, it is recommended to read Zadeh (1978).




Student A Student B Same Quantification

**Application**

Our application is simple, but it will allow to show the effect and the difference between the learning quantification process with fuzzy numerical structures and the traditionally used method. We will consider 4 students A, B, C and D who took a test and we will specifically analyze their answers from one test question. The set question is: How many divisors number 12 has? The given answers are, respectively: 6, 5, 6 and 6.

From a quantum traditional perspective it can be said that:

- If the test was made up just for that question, students A, C and D would have the same learning quantification and evidently for student B, this will be minor.
- Learning achieved by students A, C and D is better than the one from student B.

- If the class was formed just for those 4 students, we will say it is a group relatively homogeneous.
- Three students succeeded the whole test and one did not.
- Teacher's methodology has a 75% of success.

The previous observations are based on the fact that the test must be a well formulated instrument and with all the desirable metric characteristics. Under traditional methodology, factors like the emission of the answer process, enough timing for the given answer and consistence of the answer and clarity of the conceptual construct, among others; can be difficultly shown with the information given by the classical numerical quantification.

Note that, a consistent answer does not mean it is correct, but the conceptual construct the student created presents a consistent structure, however, it can be a totally closed architecture. For example, when solving the problem , $x^2-1=0$, the student can have a conceptual structure depending on the procedure $x^2-1=0 \Leftrightarrow x^2=1 \Rightarrow x=\sqrt{1} \Rightarrow x=1$, which is understood as solid and consistent, however, its consistence it is supported on a wrong construct. Now, from the fuzzy quantum perspective, the student's answers can be represented as in Figure 2. Under the fuzzy quantum integral analysis approach it can be stated that:

- The proposed methodology is more general than the conventional quantification.
- In the case of student A, the discrimination process was complex. But the answer was correct. We could suspect that the time this process required helped with discrimination and selection of the correct answer. It is possible to conclude that this student can present concentration problems.

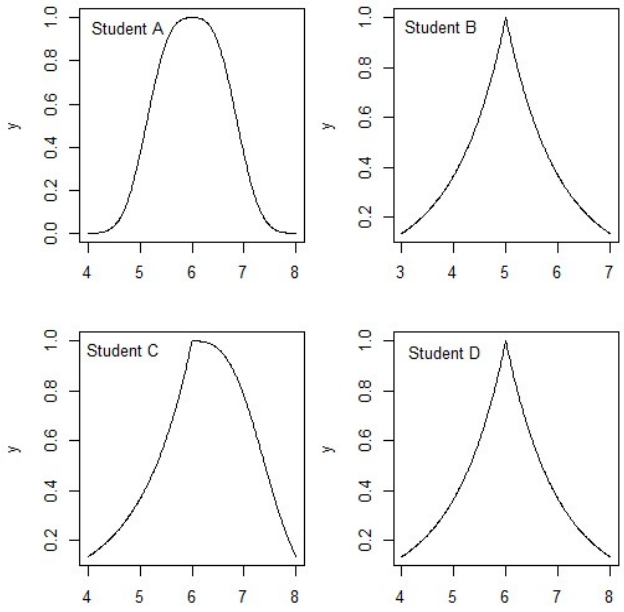



Figure 2: Forms of membership function to the quantifications of students A, B, C and D.

- In the student's case the answer B is incorrect. However there is security in its response. Is evidenced a consistent but erroneous conception or is a result of randomness. We could say it was a random answer and it could be the reflection of unknowing the concept. An analysis from this perspective allows to naturally make the following assumptions: Maybe it is due to

the fact that 1 it is not being considered as a general divisor or perhaps the concept of divisor the student embraced must be minor than the analyzed, among others.

- Student C, gives the answer in a correct way, although the emission process is quite interesting since the values which are minor than 6 definitely were not candidates or distractors with significant veracity levels. On the other hand, there are values higher than 6 as possible candidates which will allow us to assume, for example, that the student can have a confusion between the concepts of multiple and divisor, besides of the fact of suspecting that divisors can be numbers higher or equal to the number in question.
- Student D, gives a correct answer and shows consistence on the process, in a way that if we dismiss a random answer, this will reflect a clear, coherent and true conceptual construct.

Finally, let's think on the tracking and evolution of a student B during a semester in which its learning quantifications, mark 1, 2 and 3, are exactly the same to 8. Based on a conventional analysis method we would conclude that THERE IS NO EVOLUTION, whereas from the fuzzy integral representation perspective presented on figure 3, we observe that there is an evolution, that there are changes, that the student's conceptual structures begin to weaken, that the student is not reflecting consistence on the answers and the projections according to this logic are unfavorable. Therefore, as teachers, we have the duty of reaction.

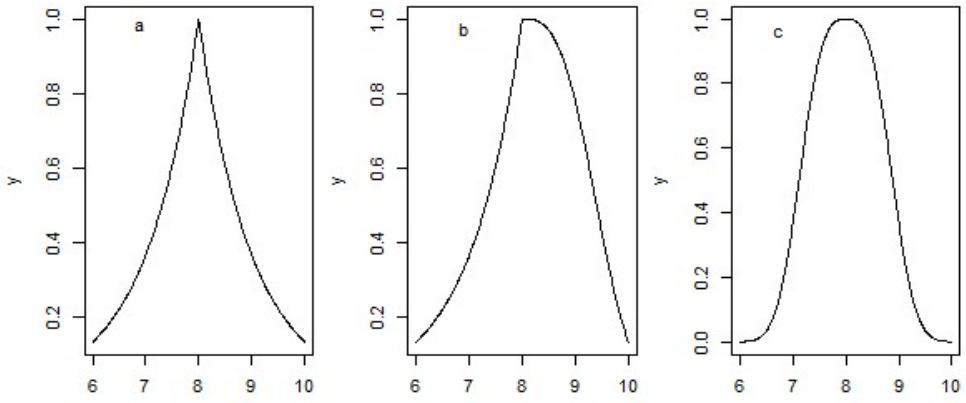



Figure 3: Changes in membership function for B student assessments.

## Conclusions

From the probabilities point of view, the fact of the evaluation actually made about learning coincides with what the student really known or learned is almost void, that is the probability that the number which we label learning equals real learning, is zero. So, assuming that learning is a fuzzy structure is a much more concrete proposal, the impact this methodological proposal has is undeniable.

This proposal promotes a change of mind, in which the conception of learning nature changes and it is located in a specific context to the nature of structures in which the imprecision of measurements is a fact, considering the relativity and uncertainty of a person.

All of those who are teachers and who are worried about the learning phenomenon generate a hierarchical structure of learning in the classroom, which few times differs from the quantifications we observe in a test and it is just that phenomenon the one we call experience, that is a future challenge. We bear in mind that membership functions or possibility models we have to offer the teach are still limited, but we are still working on that lines. Finally, what is interesting from this proposal is its connectivity with the conventional analysis and in a real context, consistent with our imprecise nature.

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# Metacognitive Awareness and its Impact on Study Strategies in An Online Learning Context

**Maria de Fátima Goulão***

**Abstract**: This paper examines the reflexions made by a set of online students regarding the results obtained in an assessment task and its consequences for the future. The sample included 43 students in continuous assessment, from both sexes. After knowing the results they were asked to indicate the implications of this exercise to their future studies. The content analysis revealed the existence of two categories - Causality (internal / external) and Influence (No consequences / Motivation / Method) - regardless of the approach to real evaluation. The reflection that students can make about their learning process and the difficulties in developing their tasks is of great relevance to achieve success. This was evident in the analysis that our students made on the completion of the assessment work, as well as the consequences for their future study. This process of reflection and awareness in the teaching learning process is particularly relevant in online education where the role of metacognitive monitoring and control system gains a prominent role. Allowing students to reflect on these issues permits them to be more effective learners..

*Keywords:* metacognitive monitoring; online learning context; adults' learners

Research has shown the importance of awareness of one's mental processes for academic success. Conditions must be created to help thought in such processes. This requirement is extremely relevant when we place it in online education system, which advocates independence for students. This work will anchor itself from a theoretical point of view, with two main topics. The first regards the issues of metacognition - Metacognition: monitoring and control and the second will focus on the particularities and challenges of online learning contexts.

## Metacognition: Monitoring and Control

We learn ever more outside formal learning contexts and periods formally defined for it. To this we owe the rapid and constant changes in our society as well as, developments, on a technological level, which require constant updating of knowledge, providing like this constant learning opportunities. It is in this context that the knowledge that each person has in dealing with learning activities, becomes a powerful tool nowadays (Bjork, Dunlosky & Kornell, 2013). The understanding of learning activities and associated processes promotes understanding, retention and transfer of learning.

Leclercq and Denis (1995) defined a good learner as *a person who solves learning problems* (p.155); that is a good regulator of their own learning. For them learning is a *regulated process of problem solving* (p.155). This process can be decomposed into six major phases and a good learner is one who can manage well each one. This process requires analyzing needs, setting goals, planning of learning strategies, executing, observing and ultimately deciding. The same can be operationalized as follows:

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**Table 1**
*Stages of the Regulation Process*

| Concerning to ... | The learner ... |
|---|---|
| ... analysis of the **needs** | ... should realize they need to learn and *why* learning *is needed*. |
| ... definition of the **objectives** | ... need to learn what is needed; is learning *what* . |
| ... planning **strategies** | ... should know when, how (what methods), at what pace, with whom. |
| ... **execution** | ... must perform truly what was expected. Many learners know what they need to do and how to do it, but they don't do it. |
| ... **observation** | ... must be able to assess his own learning level, to know what the goals are and his progress. |
| ... **decisions** | ... must be able, if necessary, to modify the antecedent steps. |

In this regard, Hacker et al (sd) refer that learners can be agents of their own thoughts and behaviors, can monitor their knowledge or skills, establish their learning objectives, outline and control strategies / plan to achieve them, monitor progress for their possible adjustments and, finally, assess whether the objectives were achieved. All this translates into what Zimmerman (2000) calls self-regulation of behavior. According to this author the concept of self-regulation can be defined *as self-generated thoughts, feelings and actions for attaining academics goals* (Zimmerman, 1998). The key element of self-regulation is self-monitoring that involves the observation and monitoring of the performance itself, as well as its results. This in order to understand their learning process and apply these strategies in future situations, where they will prove to be adequate (Figure 1).


Fig. 1. A cyclical model of self-regulated learning (Zimmerman, 1998, pag. 83)

According to Serra and Metcalfe (2007) the following aspects have been associated to the concept of metacognition - knowledge about the process, about their monitoring and their control. The learning process leads to a continuous self-evaluation and a consequent decision on what to do with the information collected: What's next? What do I need to study more? Have I study this content? What strategies will be used? (Goulão, 2009).

According to Bjork, Dunlosky and Kornell (2013) for learners to become effective in the learning process, they should not only be able to assess accurately the states of their own learning, but also be able to manage it and the activities in response to such monitoring (pág.422).

We may say that competent learners feel responsible for their own learning and perform in the process, have an active role. They know how to plan their learning from their analysis of needs and manage the process, in order to achieve the goals they have set. To achieve this they are able todistinguish which types of intellectual operations are needed, choose the teaching methods and materials they need and that best fit their learning style. Lastly, they know how tomake decisions and ask questions that allow them to progress and evaluate trends. This active role allows the learner to be observant and intervenor in his context, setting goals and acting to achieve them.

By monitoring, the learner can check how his plans become actions and through the introspection, made about their achievements, learners can perceive discrepancies between what were their goals and what actually exists. The learner can thereby exercise metacognitive control, reviewing goals, plans to adapt or operations of change (Winne & Nesbit, 2009).

According to Blakey and Spence (2000) the basic metacognitive strategies are a) to know how to relate new information with existing one, b) to know how to select the appropriate thinking strategies and c) to learn to plan, monitor and evaluate the thought processes. The reflection, in a conscious way, about the processes of learning is therefore an essential element to the development of increasingly efficient learners. To Ertmer and Newby (1996) the *expert learner* is one who is aware of the specific knowledge to reactivate, the goals they have to achieve, the strategies they need to achieve them, as well as this whole process – Figure 2.

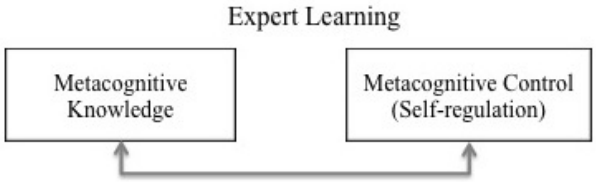


Fig. 2. Major components of expert learning (Ertmer & Newby, 1996, pág. 7)

Those learners are considered experts due to the fact that they can incorporate and implement different knowledge to improve their performance.

**Learning in Online Learning Context**

In the digital age there are many and varied sources of information that individuals face in their daily life. This reality has implications in education systems and how individuals learn providing a more dynamic learning system, in which its former linearity came to be replaced by a certain way of being and networking learning. This reality brought new scenarios and new ways of looking at the process of learning that are now taken into account.

Cyberculture and the use of technology has enabled new ways to connect with others and with information, with consequences in the methods of formal education. Access to information in different places, led to new challenges and allowed creating knowledge networks. But it is not only in access to knowledge that changes can be found. This way of sharing and living in society also has implications in the way of being and working. Collaborative learning starts having another sense. The "School" won another dimension.

The decrease of spatio-temporal constraints, that the virtual environment brings to the teaching - learning process, make them a more democratic and attractive system for those who depend on training

to acquire both the initial level, as well as a continuous education. These are precisely the elements that make these environments successful and where technological, economic, methodological and pedagogical investments are increasing and with greater success.

Technological advances have been giving a new face to distance learning systems. ICTs open new perspectives to facilitate learning. They work as tools that complement and are a real and basic support to the training system. Through the features of virtual learning environments, *virtuality* - eliminating barriers of time and space -, *globality* and the *ubiquity* - the *campus* is always with us.

This new format implies methodological, pedagogical, psychological and even emotional changes with consequent modifications in roles and functions of the actors involved in it.

Thus, the teacher changes from a carrier ofinformation to a facilitator of the learning processes; from the only source of information to an adviser, mediator, mentor, facilitator, motivator and entertainer of the learning process. Seeks to create a positive environment that gives time to answer, anticipates and resolves questions and problems. He plans and structures contents and activities, using different formats and strategies. He is, therefore, a manager and organizer of information and team work. Because of the specificity of this didactic relationship, learners and teachers, now take roles appropriate to these new demands and to the complexity inherent in virtual environments roles. This leads to the teacher incorporating new skills, without losing his former ones.

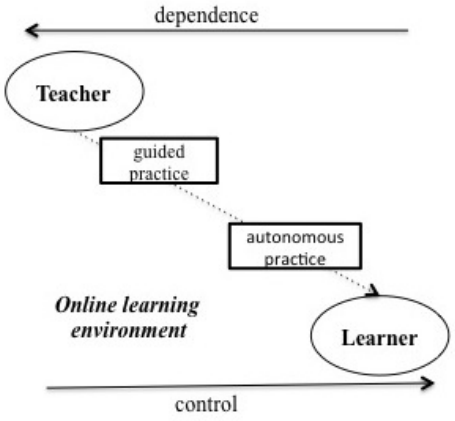


Fig.3. Methodological scenario

Thus, these new learning scenarios lead to a change of attitude and posture relative to this whole process. This change should be taken into account on both sides - learners and teachers.

Learners who know, more appropriately, how to study and how learning occurs, i.e., have better metacognitive knowledge and learn better, when compared with those who have less metacognitive knowledge. It is therefore essential to teach learners about how they learn and identify themselves with the most effective learning strategies, so that they can improve their metacognitive judgments, as well as the self-regulation of their learning.

Students in eLearning require greater self-direction and self-regulation to achieve their academic goals (Bol & Garner, 2011). To lead the students to reflect on their learning strategy and tailor their metacognitive strategies to achieve success in the task is of great relevance. This means that the incorporation of ICT in the educational context, using the virtual spaces, allows a more effective response to the educational challenges by allowing using strategies and tools that best fit to the real needs of their learners. The research work of Azevedo and Cromley (2004) points to the implications that the design of virtual learning environments have on the acquisition of knowledge.

## Method

### Objectives

This study aims to analyze the reflexions made by a set of online students regarding the results obtained in an assessment task and its consequences for the future.

### Design and participants

Data collection was made through the answers students gave to a question made after the results of their assessment were disclosure. A total of 43 students, in continuous assessment, answered the question, as volunteers.14% were males and 86% were females. The average age of the participants was 41, ranging from 26 and 57 years old (see Table 1) one student was in his 20s, 21 students were in their 30s, 11 students were in their 40s and 9 students were in their 50s. The median age was 42.

**Table 2**

*Descriptive Statistics of participants' age*

| Variable | N | MIN | MAX | AVG | SD |
|---|---|---|---|---|---|
| Age | 63 | 25 | 60 | 42.17 | 8.82 |

### Material and Procedure

The data was collected in the curricular unit *Education and Literary*. This belongs to the first year, second semester of the degree course in Education.

Before starting, a message was placed in the "News" forum about the purpose of the research and requesting the participation of the students. Whenever a questionnaire was available for collecting data another message was placed in the forum requesting the response of students.

The data collection was done in three stages. Before completing their assessment test, students were asked to indicate what grade they expected to obtain (Predicted scores). Immediately after finishing their test, they were asked again to indicate the grade they expected to obtain (Postdicted Score). Finally, after the results came out students were asked to indicate whether their real grades, were higher, lower or equal compared with their prediction. Furthermore, they were asked about what would be the implications for their study method (Figure 1). Our analysis focus on this last phase.

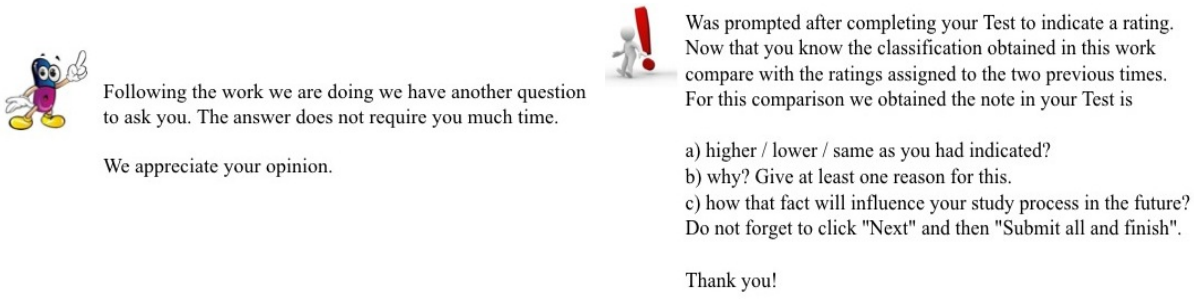


Fig. 3. (a) First part of the question - Introduction; (b) Second part of the question - Data Collection

### Data Analyses

We proceeded to the analysis of participants' responses according to how the questions were asked. It was the purpose of this research to examine the justifications given by this online students regarding the results obtained in the first continuos assessment task and how this fact will affect their study process in the future. To analyse their responses, we used content analysis.

## Results

The content analysis of the answers given by the students to the question after the results came out (actual grades) allowed us to establish the following categories and sub-categories, regardless of the dimension in question - Table 3

**Table 3**
*Categories and Sub-categories*

| Dimensions | Categories | Sub-categories | | Units of register |
|---|---|---|---|---|
| Higher / Lower / Same | ***Causality*** Statements concerning the cause of the difference in scores | *Extrinsic* | System | *Interesting and current topics* |
| | | | Teacher | *Monitoring of teacher* |
| | | | Task | *Overlap of content* |
| | | *Intrinsic* | Self | *Motivation* |
| | | | | *Self-esteem* |
| | | | | *Lack of study* |
| | | | | *Misinterpretation of concepts* |
| | | | | *Lack of objectivity in the answers* |
| | ***Influence*** Statements concerning the implications of this difference in terms of future studies | *Generics* | | *Will positively influence* |
| | | *Specifics* | Motivation | *Encouragement and Motivation* |
| | | | | *Ability to stimulate oneself* |
| | | | Method | *Structure the work in function of time* |
| | | | | *Direct the effort* |
| | | | | *Be more careful when answering* |
| | | *No consequences* | | *I will continue to study the same way* |

The indication of a Good, Bad or Equal classification, comparing the scores obtained with the ones predicted was not clear. For that reason, the content analysis presented in this paper includes the responses in global terms. The Dimension has not proved to be a suitable descriptor. The following results refer to the analysis of frequency distribution taking into account the categories and sub-categories. Table 4 shows the results found in the category *Causality*.

As it can be seen in Table 4, the highest number of occurrences that justify the classifications obtained is at the level of the subject himself. These may refer to more individual characteristics, such as motivation, self-esteem and lack of confidence in the capabilities, but also on aspects that may be more controllable by the student. This level involves the way the subject feels within the assessment task, such as an incorrect interpretation of questions, a difficulty in understanding some questions. Finally, we find the issues related to the preparation for the assessment task. These refer to the organization and planning of the study itself.

**Table 4**
*Categories and Sub-categories – Causality: Number of Occurrences*

| | Sub-categories | | | | N. of occurrences |
|---|---|---|---|---|---|
| *Causality* | *Extrinsic* **Total = 6** | System | | | 2 |
| | | Teacher | | | 2 |
| | | Task | | | 2 |
| | *Intrinsic* **Total = 48** | Self | Individual characteristics | | 12 |
| | | | Performance (Total = 19) | Positive nature | 6 |
| | | | | Negative nature | 13 |
| | | | Organization / Planning (Total = 16) | Positive nature | 10 |
| | | | | Negative nature | 6 |

We turn now to the presentation of the results concerning the influence for future study situations. - Table 5

Table 5. *Categories and sub-categories – Influence: N° of occurrences*

| | Sub-categories | | | N. of occurrences |
|---|---|---|---|---|
| *Influence* | Generics | | | 9 |
| | Specifics | Motivation | | 10 |
| | | Method (Total=17) | Performance | 8 |
| | | | Organization | 9 |
| | No consequences | | | 1 |

The largest number of occurrences indicates that the influence will be felt more deeply at the level of motivation and method of work. This is particularly true in regards to issues relating to the method of organizing tasks in either study, or in the his performance in the next assessment task.

## Conclusions

In this paper, we set out to find out and work on the reflections that of a group of online learning students has made about their performance in a very specific assessment task. In a first analysis of the responses we observed that these reflections involve mainly factors related to the students or factors that they can control.

The analysis of the answers seems to indicate an emphasis on the concern with issues related to organization and planning of the study. This is evident in both the causes and the conditions to be considered in a future study. However, reading these results should be done in a careful manner and taking into account that the students participated in this study voluntarily and that the majority considered to have a good rating taking as reference the statement given in the previous phase of the study.

From our point of view is important to know the aspects that are taken into account and valued by students to have a good performance. These elements allow us to organize tasks and outline strategies to help students find their own strategies for monitoring and self-regulation of learning, becoming increasingly autonomous and thereby achieving a deeper level of learning.

According to Ertmer and Newby (1996) reflection on the learning process is considered as an essential ingredient to develop more effective learners. In this sense we believe it is important to find

strategies that help students monitor their own learning process. This monitoring is a complex process that involves understanding what you're doing, where does that fit into the sequence of the task and also the anticipation and planning of steps to follow. All this happens during the actual act of learning. For Phelp, Hase and Ellis (2001) in the context of rapid transformation, with 'capable' learners, metacognitive strategies provide great advantages and can be considered more important than some skills. In this sense the teacher should provide strategies to help the learner become an "expert learner".

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# The Effect of Graphic Symbol Learning Environments On Verbal Problem Solving Skills Of Hearing-Impaired Students

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**Abstract**: Alternative communication means based on graphs such as photos, drawings and picture symbols could be used effectively for hearing- impaired people, but the literature provides few of such examples. Present study investigates the effectiveness of graphic symbol learning environments in problem solving skills of 4 hearing impaired students at elementary 3rd grade. The researchers made a problem pool of 22 items on add subtract. 5 of the problems were selected from the pool to give the students a test. In this way, the participants' verbal problem solving skills in add subtract were defined in pre- test. Next, the problems were presented in graphic symbols. Each of the sentences in presentations was converted into graphic symbol sentences. It was followed by reading and understanding the problem, discussing given values, students' noting the problem statement on notebooks (including graphic sentences of the verbal problem only), and the teacher/student solved the problem on the whiteboard. In the end of the practices, the pre test verbal problem was given again after modifying the numbers. It was found in pre tests that the students added all of the numbers in a column. On the contrary, the participants could determine which steps they should do subsequently for each problem in the post test.

*Keywords:* : graphic symbol, hearing impairment, mathematics, verbal problem.

Graphic symbols are considered alternative communication means for individuals with language and learning deficiency. Symbol cards, symbol boards/pointing boards, and drawing templates are expressed as traditional methods of graphic symbols in learning environments (Glennen and Decoste, 1997). Besides, graphic symbols are used to create learning environments meeting individual needs by being integrated with information and communication technologies and to help gain many upper level skills including reading and writing (Waller and Jack, 2002; Merwe and Alant, 2004; Takasaki, 2006; Marcus, 2007; Dada and Alant, 2009).

Graphic symbols, though used for various groups of special training such as the physically disabled, the retarded, the multiple disabled, the autistic, paralyzed adults and the speech handicapped, is not widely used for hearing-impaired individuals, who represent a considerable part of the population in need of special training (Hourcade, Parette, Boeckmann and Blum, 2010). In their review carried out on using of graphic symbols for the hearing-impaired, Davis, Barnard-Brak, Dacus and Pond (2010) found out only six studies based on symbolic graphics such as photograph, line drawing and words between 1971 and 2009. On the other hand, related literature provides evidences that graphic symbols are used efficiently for enhancing development of vocabulary and reading-writing training (Whittle and Detheridge, 2001; Inaba, Takasaki and Mori, 2006; Parette, Boeckmann and Hourcade, 2008; Sheehy and Duffy, 2009), cognitive capability of the hearing-impaired is comparable with that of normally developing peers (Ansell and Pagliaro, 2006), and majority of the hearing-impaired did not have reading-writing skills comparable with their peers at graduation from high school (Zernovoj, 2005).

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**Hearing-Impaired Individuals and Graphic Symbols**

Graphic symbols are considered to be materials stimulating visual intelligence for most individuals needing special training. It is studied whether or not graphic symbols can be used as a means of learning or communication for various populations of the hearing-impaired.

Heller and others (1994) investigated the effect of communication boards comprised of black and white line drawings on students with serious hearing and vision impairment. Their study focused on experiences in using individual communication boards of three high school students using the sign language who are enrolled in vocational training programs. The research revealed that the communication boards helped participants give correct answers in all of the three social communication activities. The students could respond accurately via their own communication boards to their interlocutors communicating via their boards.

Cohen, Allgood, Heller and Castelle (2001) examined the effect of picture dictionaries on communication skills of vocational training students with hearing and mental impairment. For the study sample, they identified three students who are able to use sign language as basic means of communication, have limited writing skill, are able to copy written messages and have experience with symbol-based systems. Customized picture dictionaries containing symbols as well as corresponding words or phrases were designed for each student. During the implementation, data were collected about methods used for communication by students (picture dictionary, symbol communication board, writing note, gesture, and mark), content of the message they transmitted, whether the communication was started by student and missed communication opportunities. Data analysis showed that the students benefited from the picture dictionaries effectively in order to express themselves. It was understood that the students preferred picture dictionaries for taking notes in most of the communication opportunities among all other communication methods.

Another study was carried out by Zaman, Zainuddin and Ahmad (2009) with three hearing-impaired students, one male and two females. In the study, the topic of microorganisms was taught with activities by using pictures, sign language, finger alphabet and texts in science class. As a result, it was seen that hearing-impaired individuals were more skilled in recognizing pictures and texts than sign language and finger alphabets, they could recall texts in a longer period than pictures.

Çiftçi (2009) researched 17 students' skills of making sentences and using tenses properly at 9th grade in Girls' Vocational School for the Hearing-Impaired. First, the students were shown a cartoon film and asked to express it in writing. Study data were analyzed and it was seen that the students had problems with making sentences, using tenses properly in sentences, building up meaningful sentences, choosing correct words and spelling. Afterwards, some sentences were selected as examples to be used for narrating the cartoon they watched. Subject, object and verb pools were formed in a way presenting selected sentences. In the material developed, subjects and objects were represented by graphics and verbs were represented by buttons containing animations. The students were allowed to make meaningful sentences related with the cartoon they watched by pressing correct buttons. As a conclusion, the study revealed that the material consisting of graphics and animations has a desirable effect on students' skills such as making up sentences and using appropriate tenses in sentences.

Şılbır (2011) carried out studies for teaching Turkish as an agglutinative language to individuals with hearing impairment. He selected certain Turkish suffixes (accusative (-i), dative (-e), locative (-de) and ablative (-den) of cases of nouns; present continuous (-yor), future (-ecek) and past (-di) of tenses) and prepared visual representations for selected suffixes. The system was called GÖRYAP comprised of graphic subcomponents and provided to 14 students from 6. 7, and 8th grades. Activities were carried out for learning of agglutinative structure of Turkish with this system. As a result, graphic symbols used in

learning activities were found to contribute to boost hearing-impaired students' vocabulary and teach them affixes in Turkish.

**Hearing-Impaired Individuals and Mathematics**

Ansell and Pagliaro (2006), in their study carried out with approximately 90 % of the K-3 teachers from 5 schools for the hearing-impaired, asked how often they made available story problems for their students and by which communicative means. Questionnaires were given to participant teachers. 7 of the participants were deaf, 3 had hearing impairment, and 26 of them did not have any hearing impairment. Analysis of collected data showed that the teachers rarely used story problems. As a conclusion, the study put forth that students with hearing impairment were not provided story problems early or often enough, hence they could not have opportunities for building strong problem solving strategies.

Kelly and Gaustad (2007) investigated the relationship between mathematics achievement and reading, language and English grammar skills of university students with hearing impairment. Standard tests were used to determine students' mathematics, grammar, vocabulary and reading skills. Data analysis yielded that proficiency in certain morphological structures in English has a significant relationship with mathematics besides reading skills level. The findings of the study indicate that achievement in advanced mathematics teaching can be reached only by acquisition of morphological knowledge and skills concerned with formation of English vocabulary.

Research suggests that reading-writing skill is fundamental for acquiring of many other higher level skills and thus incomplete learning of it affects quality of the other learning outcomes. Researchers investigating teaching of mathematics to the hearing-impaired place emphasis on the suggestion that such individuals' achievement in mathematics depends on their linguistic skills (Blatto-Vallee, Kelly, Gaustad, Porter and Fonzi, 2007; Pagliaro and Kritzer, 2013). Researchers put forward that building blocks of language should be taught in a systematic way in order to be able to teach advanced mathematics to those with hearing impairment (Kelly and Gaustad, 2007). Also it is pointed out that hearing-impaired individuals' performance in solving mathematics problems is determined by challenges they face in reading and understanding written texts, and the way of presenting the contents has influence on overall process (Ansell and Pagliaro, 2006; Lee, 2010). In addition, it is stressed in the literature that development of academic performance of such individuals depends on teachers' developing and using better strategies in class activities (Albertini, Kelly and Matchett, 2012). Bearing this in mind, the research was carried out in an attempt to answer the question 'Do verbal problems made readable with graphic symbols have a positive effect on hearing-impaired students' performance in solving verbal problems?'

## Method

This is a mixed methods research employing both qualitative and quantitative data collection methods since mixed research allow combining advantages of both approaches (Sale, Lohfeld, and Brazil, 2002; Creswell, 2006; Teddlie and Tashakkori, 2011; Baki and Gökçek, 2012). Mixed research pattern makes available to researchers an increased number of methods and techniques and allows using multiple approaches while seeking answer for research question (Johnson and Onwuegbuzie, 2004; Bryman, 2006). Mixed method was used in this study since it was considered suitable for the nature of this study (Hanson, Creswell, Clark, Petska, and Creswell, 2005; Collins, Onwuegbuzie and Sutton, 2006; Fraenkel and Wallen, 2008).

In present study, learning materials were developed with the graphic symbol system called Alternative Communication System for Turkish (ALİS) and its usefulness on development of hearing-impaired individuals' verbal problem solving skills was examined. Since the study requires using of both qualitative and quantitative data collection methods, it was thought that multiple approaches can be

more useful in our study as mentioned in mixed pattern. Questionnaires, interviews and document analysis were used in order to boost reliability of data analysis.

**Study Group**

Study participants included students at the 3rd grade level and classroom teacher for the hearing-impaired in the Elementary School for the Hearing-Impaired. Students' demographic properties are given in Table 1.

**Table 1**

*Demographic data of students*

| Student | Gender | Age | Student | Gender | Age |
|---|---|---|---|---|---|
| O1 | Female | 9 | O5 | Male | 8,5 |
| O2 | Female | 9 | O6 | Male | 9,5 |
| O3 | Female | 9 | O7 | Male | 13,5 |
| O4 | Male | 9,5 | O8 | Male | 9 |

The implementing teacher graduated from Karadeniz Technical University, Education Faculty, Teaching for the Hearing-Impaired Department. She has 10 years' experience, and has been teaching in the school included in the study for three years. All of the activities during evaluation of the system were carried out together with the implementing teacher. Permission was obtained from Trabzon Provincial Directorate of National Education before carrying out of the activities.

**ALİS Graphics and Learning Materials**

ALİS is the design project of a graphic symbol system as an alternative communication system for Turkish. The project was launched in order to answer the question 'Is it possible to write Turkish with graphic symbols?' Turkish is eligible for making up graphical sentences due to its certain suffixes and core vocabulary (Karal, Aydın and Günal, 2010; Aydın, Şılbır, Küçüksüleyman, Karal and Altun, 2012).

In this study, the experts (1 classroom teacher for the hearing impaired and 2 pre-service classroom teachers for the hearing impaired) made verbal problems about add-subtract operations readable with ALİS graphics. It was aimed at find out effects of graphic symbol learning materials on students' basic mathematics skills. A pool of verbal problems with 22 items was formed by the experts. Among the items, 5 were selected and put into readable form by the teacher in charge of implementation. The problems were prepared as presentation files with each sentence coded in graphic symbols. Also the story represented with each graphic symbol sentence was illustrated and added into the presentation. An example problem expressed with graphic symbols is shown in Figure 1.

**Data Collection Instruments/Techniques**

**Students' exam papers.** The experts including the implementing teacher, one classroom teacher for the hearing-impaired, and two pre-service classroom teachers (4th grade) for the hearing-impaired formed a pool containing 22 problems of add-subtract. 5 of the problems were selected for examination by the implementing teacher. The exam paper about add-subtract operation was given as pre-test before starting of evaluation of the material. The exam paper was also given as post-test after changing the figures in questions.

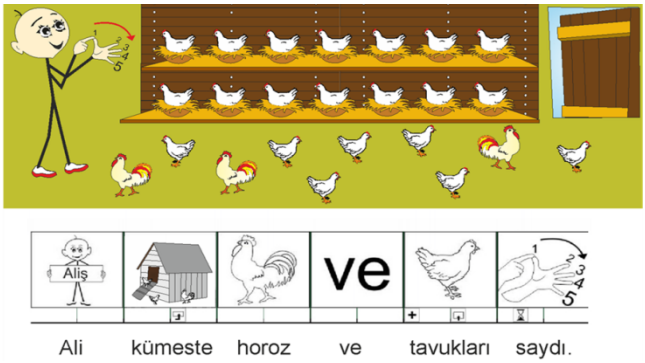


Figure 1. Example sentence and graphic symbol representation of a verbal problem

**Questionnaire and Interview**. Questionnaires and open-ended interview questions were given in order to find out implementing teacher's views on the system in depth. During evaluation of the system, both questionnaires and interviews were used to find out the implementing teacher's opinions regarding (1) utility of graphic symbols in learning environment for the hearing-impaired, (2) with what kind of activities they can be accompanied in classroom, (3) recommendations for teachers interested in using the symbols, and (4) recommendations regarding improving the system for effective and widespread use in special training. The semi-structured interviews including these questions were video recorded for in-depth analysis.

### Data Collection Process

First of all, a written examination was administered to the 3rd grade students as pre-test in order to determine their baseline verbal problem solving skills. The examination was implemented during one lesson. Following, mathematics activities designed with graphic symbols were undertaken.

The teacher in charge of implementation carried on learning activities with graphic symbols for 20 lessons for mathematics. The teacher used the sign language for communicating with students in the classroom. In order to investigate effects of graphic-aided learning environment on students' basic mathematics skills, the implementing teacher presented verbal problems prepared with graphic symbols by using the ALİS on the overhead projector. Printed problems were distributed to the students. However, those documents included only graphics, not words themselves. The problem displayed with the projector was read and studied together with students. The values given in the problem were discussed. Afterwards, the implementing teacher waited for the students to build up the problem once vowels below graphics were deleted or the whole word was deleted except for the first letter. The teacher solved the graphic symbol problems in cooperation with students by using the ALİS. The first 3 of the problems were finalized after reading and comprehending of the problem, discussing given problem, students' noting down the problem statement/words on the documents (includes graphic sentences of the verbal problem only), and the teacher's solving the problem on the board. The students were expected to solve problem 4. Two separate problems could be dealt with during one lesson hour. As a result, 20 hours of lessons were taught on average. This procedure was applied to 5 verbal problems from the pool prepared with graphic symbols by researcher. After all these steps, the implementing teacher used a verbal problem without any graphics at all, and discovered that the students succeeded solving it.

Following completion of the application, the examination on add- subtract used as pre-test was given as post-test after modifying the numbers. The implementation process was followed by questionnaire

and interviews with the implementing teacher. These instruments were used in order to obtain views and recommendations of the teacher after approximately 2 months' experience with the students using both traditional and e-learning environment designed with graphic symbols.

**Data Analysis**

Due to the fact that both qualitative and quantitative methods were used for collecting data, data analysis was done with both qualitative and quantitative techniques. Students' exam papers were subjected to document analysis. The exam papers containing verbal problems on add-subtract operation and students' basic mathematics skills were evaluated at pre and post stages. Grading was made out of 100 points.

Lastly, the questionnaires and interviews, which were administered to the implementing teacher for his opinion and recommendation regarding utility of the graphic symbols in the light of his experience with the students during evaluation of the system, were analyzed with content analysis.

## Findings

It was aimed at investigating effects of using graphic symbols on development of hearing-impaired students' basic mathematics skills. For this purpose, the exam paper covering add-subtract operation was given the students in order to realize students' verbal problem solving skills. The papers were analyzed and results were given in Table 2 below.

**Table 2**

*Pre-test results*

| Student | Score | Student | Score |
|---|---|---|---|
| O1 | 0 | O5 | 0 |
| O2 | 0 | O6 | 0 |
| O3 | 0 | O7 | 0 |
| O4 | 0 | O8 | 0 |

It was seen in pre-tests that all students added all numbers one under the other in each problem. Problem and solution made by participant O6 are given as an example in Figure 2.

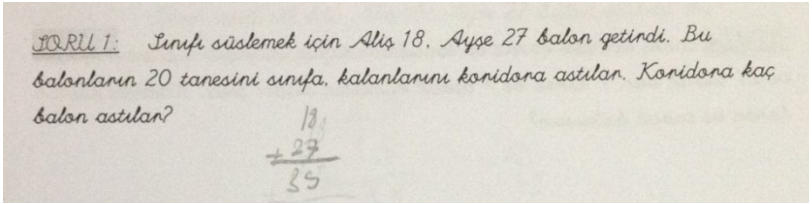


Figure 2. Sample problems and solutions used by participant O6 in pre-test

Verbal problem solving skills of hearing-impaired students were determined by using exam papers on add-subtract operations. Then, applications were performed in order to develop verbal problem solving skills of students in environments designed with learning materials based on graphic symbols. Following implementation phase of the study, the examination previously used as pre-test was given as post-test by changing numbers in questions. 4 students could not take this exam due to health reasons. Post-test results are given in Table 3.

**Table 3**
*Post-Test Results*

| Student | Score | Student | Score |
|---|---|---|---|
| O1 | - | O5 | 60 |
| O2 | 80 | O6 | 85 |
| O3 | - | O7 | 50 |
| O4 | - | O8 | - |

It was understood from exam papers that the students could identify what operations they should apply consecutively for each problem. The students' performance was found to be significantly higher than pre-test. Sample problem and solution on post-test exam paper of participant O6 are given in Figure 3.

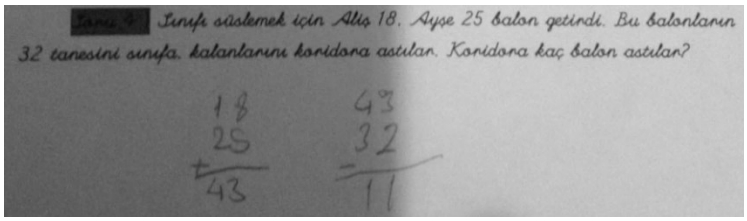


Figure 3. Sample problems and solutions used by participant O6 in post-test

The aim of the questionnaire and interviews held with the implementing teacher was to analyze effects of graphic symbols on students' problem solving skills. During applications conducted with graphic symbols, the teacher prepared and presented verbal problems by using graphic symbols.

The teacher explained that the well-developed graphic content in presentations made the activities funnier by saying '*Illustrated presentations made it funny. It was a lot of fun for them.*' As a result of the applications for improving students' mathematics skills, the teacher spoke as follows:

> 'As a result of this study, I could realize that the students did not read the problem, but they just looked at the numbers and tried to decide what to do with the numbers. But they started reading thanks to these activities. They started to be interested in reading to know what each word means due to the activities. The exams were given again by changing the numbers in problems. The students could achieve better. Successful ones did not attend the test, but those attending the test performed considerably higher.'

The teacher in implementation recommended '*Increasing number and variety of e-learning materials*' for promoting efficient and widespread use of graphic symbols for those with hearing impairment.

## Conclusion

In this study, answer was sought for the question 'How do the learning materials developed with graphic symbols affect development of verbal problem solving skills of the hearing-impaired in add-subtract operations?' Those with hearing impairment do not have linguistic skills comparable with their peers (Kelly and Gaustad (2007) and the way of presenting the verbal problems has influence on hearing-impaired people's skills of comprehending and solving the problem (Lee, 2010). On the other hand, the literature provides that graphic symbols are often used for the purpose of teaching reading and writing skills. In particular, it is stressed that those needing special training have a tendency to define graphic symbols far more easily than written words (Zaman, Zainuddin & Ahmad, 2009).

There are studies carried out on normal and special individuals regarding expressing oneself by using graphic symbols, understanding what is expressed, communicating, learning words or concepts as well as producing sentences at various levels of syntactic complexity. Those studies were found to have the potential to support reading and writing skills of individuals (Koul, Corwin & Hayes 2005; Trudeau, Sutton, Dagenais, Broeck, & Morford, 2007). Furthermore, it is stressed in the literature that hearing-impaired students should be taught strategies and tools of solving verbal problems and such strategies and tools should be developed in order to help read and solve verbal problems (Zernovoj, 2005). Bearing this in mind, this study was carried out to examine verbal problems made readable with graphic symbols on hearing-impaired students' problem solving skills. Study results were found positive in consideration of expected outcomes.

It was concluded that using graphic symbols in learning environments improved the learning environment and facilitated the learning process. The activities were realized to help students read, comprehend and solve graphic symbol verbal problems, and they indicated that such symbols can be used for developing basic mathematics skills of students. In a parallel study, Berends and Lieshout (2009) investigated the effect of different types of graphics on speed and accuracy of problem solving performance of normal students. In the study, the verbal problem was presented along with a graphic to help solve it or with a graphic containing a generic picture regarding the problem not helping solve the problem. They found that using of graphics has a positive effect on academic performance.

It can be inferred that verbal problems made readable with graphic symbols contributed to students' understanding the problem. Ansell and Pagliaro (2006) underline the importance of way of presenting the verbal problems. They point out that understanding the problem statement and expression of the problem is a prerequisite for student achievement in relation with problem solving. They also suggest that teachers need to take notice of the challenges faced by students in understanding the written language and thus they should present verbal problems in a more understandable way depending on their communicative preferences. They believe that the way of presenting the problem is an important factor which could influence students' success. Findings of present study seem to justify the recommendations proposed by Ansell and Pagliaro to improve verbal problem solving skills of hearing-impaired students. As a conclusion, it can be argued that graphic symbols have a potential of increasing hearing-impaired students' achievement in mathematics.

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# Exploring the Gap between Content and Learning Outcomes in Nepalese Technical Education

**Hari Prasad Nepal** *

**Abstract**: I have come across that some people with technical education who are being unemployed in the domestic job market is curious which made me selecting this issue. Very few researches have conducted on this issue in Nepalese context, so it becomes important to carry out a research to explore the reality. This study attempts to explore various themes in between the content and learning outcomes of technical education. While developing this paper I have prepared the research question as why there is a gap between content and learning outcomes in TVET programs. As methodological approach I used interpretive paradigm i.e. qualitative approach. First, I raised the issue then interviewed the participant, transcribe the record, generate themes and interpret the themes with the support of literature and theory. This research was delimited to content verses learning outcomes component and other issues were ignored. It was limited to CTEVT programs only. Primary data were collected based on interview. After interpreting the data I came to conclude that improper allocation of budget, weak linkage in education, improper management, traditional approaches of teaching, not upgraded curriculum, and the learning environment is affected by politics. Based on the findings and conclusion, I have suggested some implications to cater the problems as to adopt new technology like ICT, encourage small business activities, meet employer's expectation, enhance council's staff capacity, allocate sufficient economic resources, connect training to work experience, decentralize and institutionalize the management.

*Keywords:* contents, learning outcomes, management, learning environment, approaches of learning, curriculum

In recent years, I have come across some such people whose life stories have triggered my thought as to why people with a technical education are being unemployed in the domestic job market. I made up my mind to conduct research in this area. Broadly talking, there may be a wide gap between content and the outcomes of the technical education in Nepal. To some extent, there is a problem even in content but in this study the problems of content were ignored (Sharma A. , 2000). Only the factors associated with creating the gaps are analyzed in this research study.

Why this gap between content and learning outcomes is crucial? What are the major reasons behind this and what can be the solutions to these problems? Critically exploring these issues is the main purpose of this paper. For this purpose, I pointed out the different educational themes and dig out the factors related to these. Both outcome and effectiveness are the main result of any kind of educational program including the technical education (Acharya, 2011). Linking education and practice, I argue that technical education needs to clearly set its purpose in terms of curriculum, teaching learning methods, educational management and define their own theoretical and skills foundation while still engaging in the instructional design of meaningful and effective environments (Baral, 2012).

The purpose of technical education is to produce skilled workforce for enhancing their employment opportunities which help enhance the economic status of the unemployed people. Technical institutions have their own responsibilities to provide market consumable skills both national and international quality (Bhandari, 2012). It is believed that TVET specialists regularly monitor the market and include the goals, objectives, contents and methods of teaching in their curriculum (Khatri, 2006). Teaching learning process plays the significant role to attain objectives and

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content of program, and in this process instructor is the focal person, who helps to transfer certain skills, knowledge and attitude to the learner (Lamichhane, 2006). TVET curriculum is practical and must include the project and lab based instructional design. Employment rate of the TVET graduates was found the below the expected standard set by CTEVT for its technical schools. There should be linkage and correlation between curriculum, content, methods and learning outcomes of technical education (Lamichhane, 2001).

The distinction between learning outcomes and learning objectives is not universally recognized and many educationists may find that the term "learning outcomes" describes what they have already understood by the term "learning objectives". Some scholars make no distinction between the two terms; those who do usually suggest that learning outcomes are a subset or type of learning objective (Anonymous). However, people believe that there is a clear cut difference between content and learning outcomes. Recent decades have shown an increasing stress on the need to monitor and manage both contents and learning outcomes of the education system (Oakleaf, 2011). After a brief sketch of the background to the notion of educational component, arguments are presented to show their vacuity and explanations in the gap between content and learning outcomes.

Normally, it was expected that the knowledge and skills acquired once would work for the whole life. At present, the concept of learning has changed globally; the concept of lifelong learning has been accepted and welcomed which advocated that all forms of learning (Sharma, 1999). After studying the previous researches about the gap between content and learning outcomes, I came to know that even though many researches have been conducted on the content or in learning outcomes, on the topic of "gap between", very few researches are conducted in Nepalese context (Paudel, 2008). Thus, it becomes important to carry out a research on this issue in order to explore the gap.

## Statement of the Problem

In Nepalese context, the objectives and contents are set on the basis of international practices but the outcomes of education are found very low and not according to the market demand (Pant, 2008). This is the major query which is a big matter of curiosity for me. Usually, students are concerned with their job and career development. They need competent and market absorbable knowledge and skill. It provides not only the routes to further education and training but also the successful transition to the employment (Mark, Klemz, & Murphy, 2003). It was not yet researched what measures can fulfill the gap between content and outcomes of the technical education in Nepal and how such solutions can be implemented. This is another big question to be answered in Nepalese context. That's why I raised this research issue.

For reducing the poverty, the role of technical education is significant, if the prescribed content meets their standard and gives the effective learning outcomes. Both nationally and internationally, employment markets must require a productive workforce with technical and vocational skills to meet the quality standard of their product (UNEVOC, 1996). There have been very few small component based studies conducted on the gap between content and learning outcomes of TVET. While I was developing this research, I collected very few literatures. This study, therefore, was an attempt to identify a visible gap between what already existed and what to be explored in technical education focusing on the content and outcomes of TVET programs. There has been a need to generate a new insight into the status of the gap (Butterfield, 2012). There was also a need to explore the solutions for this gap and link them with outcome based education in Nepal.

## Purpose of the Study

This research paper will describe four major themes between content and learning outcomes of technical education, which is believed leading the gap and explain how to use solutions to

constructively manage this gap. Those four themes are namely management, modes and approaches of learning, facilities for learning and learning environment. More precisely, this research attempted to explore themes and various factors in between the content and learning outcomes of technical education. Based on the above problem statement and purpose of the study, the following research question was formulated to develop this research: Why there is a gap between content and learning outcomes in TVET?

**Delimitation**

This study was focused on the gap between content and learning outcomes in technical education of Nepal. Due to the various constraints, the researcher had delimited this study in the following ways,

1. The main focus of the study was delimited to the gap between content verses learning outcomes component and other issues were ignored.
2. The study was limited to CTEVT programs and only two technical education specialists were interviewed. The study was also limited to interviews with technical education expert currently giving their services in CTEVT.
3. The interviews and data collections were limited to a 15 minute time frame each and conclusions regarding gaps were based on answers to interview questions.

## Method

Methodology is an overall plan, procedure that is implemented to do research and entire research is dependent upon the methodology of research (Cresswell, 2003). As a methodological approach I used qualitative approach in this research. As my research demands the interpretation of my participants' perception and their intended meanings I choose interpretive paradigm for this research.

**Data Collection**

The data collection phase was one of the most critical stages. There are several methods of data collection, interview is one of the common methods of data collection in qualitative research (Cohen & Morrison, 2000), the primary data were collected mainly based on interview. So, the primary source of collecting information was the one-to-one, face-to-face interview of the technical education expert identified for the study. The purpose of interviewing was to find out what was in and on the participants' mind regarding the research questions of this study. To fulfill the purpose of this research study, the secondary data was collected from different books, journal article, internet and blogs.

**Data Analysis**

During this research, the first step I performed was the identification of themes. After concluding interviews, the interview transcripts and record were repeatedly replayed and reviewed. Once the significant statements were identified, they were coded and categorized according to the research questions. Based on the themes obtained through the primary and secondary data, the influencing factors were identified. Additionally, the themes obtained were discussed and supported by the relevant theory and literature in this study.

**Ethical Considerations**

Ethics are the principles and guidelines that help us to determine and uphold what is morally justifiable. Ethics refers to moral principles or values that generally govern the conduct of an individual or group. Ethics apply at every stage of the research study (Denzin & Lincoln, 2000).

I have obtained consent from each research participant. I informed them about the objectives of the research and expected the contribution from the side of the participants. It was also clearly mentioned that in case they felt not like to respond to any question it was up to them. Similarly, I clarified to them that any time they could quit the interview if they want. I have tried my best to select the participants fairly. Further, to maintain the confidentiality, I informed the research participants about the process of the research. I also mentioned that the opinions expressed by them would not be revealed except to the course instructors.

In recent years ethical considerations across the research community have come to the forefront. This is partly a result greater awareness of human rights and data protection and also a result of increased public concern about the limits of any inquiry. There has been enhanced concern for responsible behavior within the workplace, which is maintained in this research study (Best & Kahn, 2003).

## Findings

This section presents the interpretation and analysis of the data that I collected from participants though using interview tool. Here, I discuss the data collected through interview and try to make clear about the gap between contents and learning outcomes of technical education in Nepal.

### Setting the Scene

I went to the research site and interviewed two participants from CTEVT located in the periphery of Sanothimi, Bhaktapur. First I interviewed, health coordinator, in the division of polytechnic Mr. P1 and then after Mr. P2, the senior agriculture specialist in the same division. In the process of interpreting data I developed themes for the data under main heading and sub heading. The themes were determined after collecting the data on the basis of responses of asked questions given by the participants. In order to maintain authenticity, I have included participants' responses without any modification in audio record.

### Participants' Profile

Before presenting the analysis of data, I would like to briefly present participants' profile. While presenting their profiles I present only the professional background of the participants' in order to maintain confidentiality of the participants and to be ethically correct.

Participant 1, which is known as a P1 in this study

*P1 is a male expert of 54, who has been working in CTEVT for 19 years in technical division and he has been teaching in nursing colleges from the last 6 years. Regarding his qualification, he has done MPhil, MPH and he is also doing PhD. He has also national and international exposure to his subject matter.*

Participant 2, which is known as a P2 in this study

*P2 is 56 years male expert; he has been working in CTEVT for twenty years plus in technical division. He has received a number of trainings and attended few workshops related to his field. He has done BSc Ag.*

The interpretation and the analysis are presented under different themes in the following:

### Theme One: Management

The first question was related to overall management of CTEVT and its programs. When I asked the participants what is the management system of CTEVT and what is the importance of its program, both participants presented ambiguous perception about the management of CTEVT and its program. The responses given by respondents are given as follows:

P1: There is a section of curriculum development and revision in CTEVT. This section is fully responsible for revising and updating the curriculum. However, this section is not functioning well.

P2: CTEVT is facing the problem of economic resources due to the very low allocation of government budget in this sector. If we, (CTEVT), get the enough economic resources, then we can well manage the programs and institution as a whole.

P1: Political interfere and political instability are also the huge problem to manage the CTEVT programs and its affiliated institutions. CTEVT is also unable to control the over production of our human resources in some programs like staff nurse.

P2: We are implementing very old curriculum and we hardly have revised it on the basis of market demand. In CTEVT, there is no section of labor market analysis, subject committee and academic board. Comprehensive types of contents are there in curriculum.

P1: Teaching methods and styles are outdated like lecture method and note making. We are unable to apply and manage modern approaches.

P2: Scheduled and weak monitoring system is there.

P1: Over flow of students, institution and the same number of staff in CTEVT from the last 18 years are some of the major problems in CTEVT or in technical education of Nepal.

There are different management theories in the practices like scientific management, administrative management, bureaucratic management, human relations management, behavioral science, system theory, contingencies and so on. These are the theories which are almost all focused on the effective utilization of resources. Resources may be human resources, financial resources, information resources and physical resources of the concerned organizations. From the respondents of this research issue they raised the problems of resource utilization due to the under staff and financial deficiency in CTEVT. Thus, I can conclude that, there is a big role of management style to bridge the gap between contents and learning outcomes in CTEVT programs.

Ineffective management is a serious problem in any kind of organizations or institutions. I believe that the bureaucratic style of management is inappropriate for CTEVT. Therefore CTEVT should adopt the contingency management approach to bridge the problem.

Management is known as the organization and coordination of the activities of a business in order to achieve defined objectives. Management is often included as a factor of production along with machines, materials, and money. The basic task of management includes both innovation and marketing. Management consists of the interlocking functions of creating corporate policy and organizing, planning, controlling, and directing an organization's resources in order to achieve the objectives of that policy. In CTEVT context, financial deficiencies and political interfere are the major factors for ineffective management.

From above discussion, it is clear that, under finance, political interfere and under staff are the major constraints for effective management in CTEVT. It can be elucidated that this institution is guided by the traditional approaches of management even though; CTEVT has been using some modern techniques, like information and communication technologies in their daily official activities.

The directors and managers, who have the power and responsibilities to make decisions and oversee a CTEVT, should start the new initiation for effective management of the organization. The size of management can range from one section to another of technical education. In large section, the coordinator defines the policy which is then carried out by the sub-ordinate officers and employees. It is believed that in order to evaluate an organization's current and future worth; the most important factors are the quality and experience of the managers and coordinators (ACTE, 2013).

At last we can conclude that management inefficiency is the key factor to create the gap between content and learning outcomes in technical education. In habermasian language, in this theme there is controlling

(technical interests) but lacking understanding and empowerment. In my understanding and from the above discussion it is clear that the ineffective management practices of CTEVT is promoting the gap between contents and learning outcomes (Grundy, 2002).

**Theme Two: Modes and approaches of learning**

The second question was related to modes and approaches of learning. When I asked the participants about their views on the topic, they prioritized the teaching methods. In this regard participant said;

> P1: CTEVT proposed modern tools, modes and approaches of teaching and learning in their curriculum but in practice only lecture method is widely followed by the instructors.
>
> P2: All the courses are designed on the basis of practical classes. There are enough libraries and labs but the flow of students is very high so adequate practice in the lab and project is not possible
>
> P1: The traditional and outdated note making and lecture method is normally used in classroom practices. Instructors are not trained to use ICT and modern tools/techniques in the classroom.
>
> P2: We are strict in the process of giving affiliation to private institutions and it's their responsibilities to instruct the students whatever modes and approaches they follow.
>
> P1: CTEVT only regulates and monitors the programs.
>
> P2: All the courses are practical and project based but while implementing phase, there can be traditional approaches and modes of learning.

Regarding the question about modes and approaches of learning, participants gave their view that it should be modern and concurrent but they also told that traditional approaches are in practice in CTEVT. A teaching method comprises the principles and methods used for instruction. Commonly used teaching methods may include class participation, demonstration, recitation, memorization, project work or combinations of these. The choice of teaching method/methods to be used depends largely on the information or skill that is being taught, and it may also be influenced by the aptitude and enthusiasm of the students. Newer teaching methods may incorporate television, radio, computer, and other modern devices. Some educators believe that the use of technology, while facilitating learning to some degree, is not a substitute for educational methods that encourage critical thinking and a desire to learn. I also believe that teaching methods should be learner centered and friendly to the participants. In CTEVT the entire course are offered in practical basis so learning by doing approaches are more suitable than other methods. We can use inquiry method to develop the learners' knowledge, which is also known as a modern method of instruction.

From the above discussion it can be interpreted that all the participants recognize that each person prefers different learning modes and approaches. Learning approaches denotes common ways that people learn. Everyone has mix ways of learning styles. Some of people may find that they have a dominant style of learning, with far less use of the other styles. Others may find that they use different styles in different circumstances. There is no right mix nor fixed. We can develop ability in less dominant styles, as well as further developed styles that we have already used well.

Using multiple learning modes, approaches and multiple intelligences for learning is a relatively new approach. This approach is one that educators have recently started to recognize. Traditional educational institutions used to adapt the lecture and logical teaching methods. They also used a limited range of learning and teaching techniques. Many technical institutions still rely on classroom and book-based teaching, much repetition, and pressured exams for reinforcement and review. As a result we often label those who use these learning styles and techniques as bright. Those who use less favored learning styles often find themselves in lower classes, with various not-so-complimentary labels and sometimes lower quality teaching. This can create positive and negative spirals that reinforce the belief that one is smart or dumb.

By recognizing and understanding our own learning modes and approaches, we can use techniques better suited to us. This improves the speed and quality of our learning. The method of Multiple Intelligence is appropriate for CTEVT students to develop their knowledge, skills and attitude. At last, we can conclude that ineffective and not meaningful modes and approaches of learning is the important component to foster the gap between content and learning outcomes in technical education. In habermasian language, there is controlling but lacking understanding and empowerment (Grundy, 2002).

**Theme Three: Facilities for learning**

Responding to the question about facilities for learning, the participants said:

> P1: There is an enough infrastructure; buildings, labs and other resources in technical institutions. But in remote areas like Humla and Jumla there may not be sufficient facilities.
>
> P2: We think that learning facilities depend on geographical regions and institutions.
>
> P1: Due to the lack of sufficient economic resources all the facilities which learners demand can't be fulfilled.
>
> P2: Hostels, buses, internet, well equipped buildings are lacking even in the institutions run by CTEVT. Books, hand out and practical classes are there.
>
> P1: Satisfactory teaching learning process can be seen in the technical education program in comparison to general education system.

From the above discussion, it is widely acknowledged amongst today's educators that learning facilities have changed dramatically since the last century. In recent years, we have witnessed rapid social and cultural changes, phenomenal advances in communication and information technologies, as well as the introduction of the internet within schools and technical institutions. These factors have contributed to shape the teaching and operating cultures of technical institutions and created shifts in our expectations of the physical learning environment. They have affected instructors, educators and researchers the world over. These miniature revolutions have given rise to an urgent need for a new generation of facilities to cater for 21st century teaching and learning needs in technical education.

In addition, the concept of facilities for learning will become increasingly significant as technical schools of the future become centers of lifelong learning. Learning facilities is a term used liberally in educational discourse because of the emerging use of information technologies for educational purposes on the one hand, and the constructivist concept of knowledge and learning on the other. The facilities for learning means a physical space that supports multiple and diverse teaching and learning programs and pedagogies, including current technologies; one that demonstrates optimal, cost-effective building performance and operation over time; one that respects which is in harmony with the environment; and one that encourages social participation, providing a healthy, comfortable, safe, secure and stimulating setting for its occupants. In its narrowest sense, a physical learning environment is seen as a conventional classroom and, in its widest sense, as a combination of formal and informal education systems where learning takes place both inside and outside of schools. Traditional school teaching is almost conveying too much theoretical information and for preventing in-depth learning. Many people believe that inert knowledge is relevant for exams but not for real-world problems. This idea is posing new challenges and exerting pressure to bring about changes in facilities for learning.

Moreover, from above mentioned discussion, it is clear that, in order for a school to develop into a dynamic physical learning environment, there needs to be a behavioral change in relation to planning and producing spatial solutions. Change cannot occur without input from instructors and students which are the main technical school users. Instructors and students who conceived the study

applauded the significant shift away from the traditional classroom and said how much they would like to work in a similar space.

Furthermore, if a technical institution provides a quality learning facilities for students, this will facilitate the acquisition of skills that are important for society. The choice of equipment is important: it should be versatile, resistant, durable and easy to repair. User-based innovative processes should be at the heart of designing the physical learning environment of tomorrow's technical schools. This process should take into account the global needs of learners, instructors, technical school administrators and the community, while respecting the environment. A judicious selection of products and services that minimizes negative environmental impacts will also be of benefit to all.

Similarly, physical facilities are the plant facilities provided in the technical institutions in order to facilitate teaching learning process. It includes building, availability of enough rooms, proper lighting and ventilation, seating and furniture, provision of pure and safe drinking water, availability of play grounds, laboratories, writing boards, enough washrooms etc. In order to improve teaching learning process, general cleaning and particularly the cleanliness of class rooms are necessary. More precisely, excellent learning facilities are basic ingredients for good technical education programs and are very important for achieving the targets and improving the quality standard of education. The phenomena that some technical schools/colleges have surplus facilities and others lack them are an indicator of poor educational planning in technical institutions.

From the given analysis it is clear that inadequate learning facilities certainly lead the gap between content and learning outcomes, which can be seen in technical education of Nepal. In habermasian language true understanding takes place through mindful applications. More precisely, in this theme it is clear that there is understanding but lacking application (Grundy, 2002).

**Theme Four: Learning environment**

Regarding the question about learning environment the respondents said:

> P1: Learning environment is very suitable and favorable in CTEVT program but some factors are disturbing its program such as bandha, political instability of the country, low economic, resources of CTEVT, student unions etc.
>
> P2: Course coverage is almost good but some private institutions are cheating by hiring under qualified instructor and completing their course in 1 and 2 months.

Learning environment **is** the diverse physical locations, contexts, and cultures in which students learn. Students may learn in a wide variety of settings, such as outside-of-school locations and outdoor environments, learning environment is often used as a more accurate or preferred alternative to *classroom*, which has more limited and traditional connotations, e.g. a room with rows of desks and a chalkboard.

Moreover, learning environment also encompasses the culture of a school or class, its presiding ethos and characteristics, including how individuals interact with and treat one another, as well as the ways in which teachers may organize an educational setting to facilitate learning e.g., by conducting classes in relevant natural ecosystems, grouping desks in specific ways, decorating the walls with learning materials, or utilizing audio, visual, and digital technologies. The qualities and characteristics of a learning environment are determined by a wide variety of factors, institution policies, governance structures, and other features may also be considered elements of a learning environment.

Similarly, learning environments have both a direct and indirect influence on student learning, such as their engagement in what is being taught, their motivation to learn, and their sense of well-being, belonging, and personal safety. Learning environments filled with sunlight and stimulating educational materials would likely be considered more conducive to learning than drab spaces without windows or decoration, this can result schools with fewer incidences of misbehavior,

disorder, bullying, and illegal activity. How students interact with one another may also be considered aspects of a learning environment, and phrases such as positive learning environment or negative learning environment are commonly used in reference to the social and emotional dimensions of classroom learning.

Furthermore, from the respondents of this research they raised the problem of course coverage in CTEVT. Thus, it can be concluded that there are also other problems which are leading the factors such as minimum resources, ineffective management, and theoretical bases of courses. We can't control all aspects of the learners that come our way; each student brings in his or her own learning strengths and challenges, concept of self, and so on. We can, however, change ourselves, the change begins within. It is a metamorphosis, which begins from within the instructor moves outward to the classroom, and on to the students.

Moreover, it is hard to well manage all aspects and factors of the environment, but we can manage some. For example, we might not have control over course scheduling or other institutional policies; however, we can control ourselves, our space to some extent, and the way we design our curricula, methodologies, and assessments. We can design our courses and learning experiences to provide access to the broadest possible number of students. We can help the learner construct his or her own meaning by nurturing metacognition and by creating appropriate learning experiences. Instruction is truly the art of changing the brain.

Finally, we can conclude that learning environment play significant role to deliver the contents to the learner. Inappropriate learning environment leads the gap between content and learning outcomes in technical education. In habermasian language in this theme CTEVT should focused on empowerment (Grundy, 2002).

## Conclusion

Based on the research questions, the following conclusions have been drawn by the researcher:

1. Proper allocation of national budget to the CTEVT and establish the strong linkages between contents and learning outcomes.
2. Improper management of CTEVT and its resources, should link TVET programs with employment
3. Traditional modes and approaches of instruction is in practice, regular updating the contents and curriculum as a whole
4. Learning facilities are very low even the courses are prescribed in practical form. And learning environment is affected by politics and political environment/players

## Implications

The following measures are suggested for fulfill the gap between contents and learning outcomes.

1. Adopt new technology to meet changing nature of teaching learning environment
2. Encourage small business activities rather than government job for students
3. Meet employer's expectation, should focused on training for self-employment
4. Link performance to resource allocation and enhance the council's staff capacity, economic resources
5. Connect training to work experiences and better to establish labor market information center
6. Decentralization of management and institutionalize the linkage system.

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# System Analysis and Solution Suggestions for Problems Occurred During Orientation Process in Distance Education

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**Abstract**: In this study, it was aimed at determining the problems encountered by the distance education students in orientation process through system analysis. In the light of this purpose, a needs analysis was conducted. During the needs analysis, literature was reviewed and the experts were consulted for determining the problem statement. The study group of the study was composed of 44 students who were taught through distance education at Distance Education Center, a state university. The data were collected from the students, technical support group and instructors. The survey and interview techniques were used during the data collection. The frequency, percentage and mean statistics were used in data analysis. When the problems were observed, it was agreed that each of them was an educational problem. It was foreseen that all these educational problems could be overcome through an online orientation training taking the recommendations of technical support and instructors.

*Keywords:* student orientation; distance education; system analysis

Orientation can be defined as individuals' adaptation to a new situation or new environment (Bilgili, 2007). The individuals might be subjected to an orientation when they start a new school or a profession in order to find out the opportunities and rules of the environment (Ceylan, 2005). The purpose of the orientation given at the beginning of the process is to make students familiar with the new situation and new environment. The required preparation and organizations should be completed before the students come to school so that this service could accomplish its goals (Yeşilyaprak, 2003).

As in traditional environments, the orientation process is also important in distance education, which has developed in parallel with the change in the understanding of technology and education (Scagnoli, 2001). In courses taught through distance education, some applications and other advanced technologies like multimedia technologies, video, graphics, voice-based communication that should be installed and customized in order to accomplish the objectives of the course are available. Because of the additional technical requirements, an online preparatory environment that introduces technologies and platform for students' achievements is important (Mencsh, 2009). At the end of the studies, it was found that orientation was a recommended solution for the problems experienced in distance education systems such not knowing how to communicate with others, having technical problems, not finding a solution for these problems and the rate of leaving the distance education system was high (Cho, 2012). Orientation trainings are becoming more and more important in distance education so that the students who are not familiar with the system, course procedures and the process could get familiar with the environment (Bergmann & Raleigh, 1998). However, it was seen that it was not given enough importance to the orientation training services in Turkey although there are many online vocational, undergraduate, graduate and certificate programs. It was seen that there are only some sample online course recordings or limited number of videos showing how to share audio, video and screen under the title of orientation services. However, when the samples in

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abroad were examined, it could be seen that there were some websites in which some examinations were given in order to measure the technical knowledge of the registered students; there were some detailed information on what kind of problems the students might encounter throughout the process; and additionally, there were some evaluation web pages that determined whether the information were learned or not. When the literature was reviewed, it was found that the orientation program given for the online courses had the same objectives with the one given for the school environment and both of them increased the academic and social interaction and developed the sense of belonging to virtual learning community (Robinson, Burns & Gaw, 1996, Cited in Scagnoli, 2001). Different learning skills are required for online learner when compared to the traditional learners and the orientation that is designed for this group should be related to the different skill sets (Wilson, 2008). The participation into the orientation program which includes the teaching of tools in e-learning system in distance education and organized before the first course could establish self-confidence (Rovai, 2003). Hence, in a study by Atack (2003) in which the web-based learning experiences of the nurses were examined, the findings that nurses spent more time for learning how the system worked and they could not concentrate on the content indicated that the orientation before the process was required. Moreover, it was also found in the studies that the orientation training given at the beginning of the distance education process had positive effects on the students' leaving the distance education (Lynch, 2001) and their performances (Wojciechowsk & Palmer, 2005). Furthermore, the orientation training offered for the distance education programs could make students aware of the new educational technologies and pedagogy that they would use during the course (Mensch, 2009). Moreover, in the study carried out by Ali and Leeds (2009), it was found that the performances of the students taking orientation service were higher than that of the ones who did not take any training and this indicated that orientation process was quite important in distance education process. Bruso (2001) stated that the purpose of the orientation was to develop computer skills for some students while it was to help to get familiar with the online course environment for some students.

The studies indicated that orientation training had positive effects on students' leaving the distance education and their effective communication skills. In Lynch's (2001) study in which the effects of orientation training on distance education students were examined, it was found that 89% of the students participating into the orientation training developed technology skills, 74% of them developed independent learning. Moreover, 95% of the students indicated effective communication skills through web based tools. Orientation training had also positive effects on the student dropout rate. The rate of the students who left the course decreased by 15% and the registrations increased by 90%. Similarly, in the study carried out by McVay (2000), it was found that the technological skills, self-management, connectedness and independence feelings of students with online orientation training increased and their dropout rate decreased. In a study conducted by Wojciechowsk and Palmer (2005), similar findings were obtained. There is a strong relationship between the students' participation into the orientation session and their performances in online course. The findings of these studies are the important indicators for the positive effects of orientation in distance education process.

In this perspective, the purpose of the study is to determine the problems encountered in the orientation process by the students who were newly registered to the distance education and to provide solutions for these problems. Within this framework, system analysis was carried out in order to determine the current problem statements. In the study, distance education which was an educational system was taken into account and it was attempted to determine the educational problems in orientation process through needs analysis.

## Method

### Research Design

In this study, case study method was used. Yin (1984) described case study as a research method that examined the researched phenomenon in its own environment. The situation taken in this study was the orientation processes of the students who newly registered for the vocational and undergraduate programs at a distance education center. The registration process is the period between the legal registration of the students for their programs and the starting of the online courses. Online course process is the process in which the registered students followed their classes on the Internet via Adobe Connect software. Online examination stage was the use of Moodle learning management system in order to complete the evaluation. The stages of the orientation process are illustrated in Fig. 1.

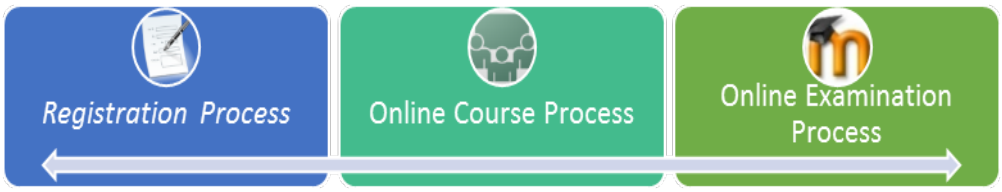


Fig. 1. Orientation Process

### Sample of Research

The study group was composed of 44 students who were taught at Distance Education Center, a state university, through distance education. Of the students in sampling group, 40.9% (n=18) were female students and 59.1% (n=26) were male students. In terms of their educational background, 38.6% (n=17) of them were college students and 61.4% (n=27) of them were undergraduate students. The ages of the participants ranged from 19 to 40 and the mean age was 24.5. Moreover, 4 instructors and 4 technical support members were consulted for their views about the orientation process. Moreover, 4 instructors, who taught newly registered students via distance education, and 4 technical support group members working at this department were interviewed on the orientation process. Each interview lasted for 25 minutes on average. The interviewed instructors were coded as I1, I2, I3 and I4, the technical support group members were coded as T1, T2, T3 and T4. Of the teaching staff, I1 and I2 had been teaching for three years; and I3 and I4 had been teaching for two years. The working experience of the technical support group members who provided technical support for instructors in distance education process was more than five years. The reason for choosing this study group was to take all elements (student, instructor, technical support group member) in distance education system within the context of system analysis.

### Research Process

Within the context of the study, the orientation process of the distance education students was taken with system approach. System is the combination of elements that are in an interaction with each other in order to accomplish an objective (Yalın, 2008). The elements constructing the system are in an interaction with each other. Each element in the system affects the outcome. In the distance education system taken within the framework of this approach, student, instructors and technical support group members were taken as the system elements and system analysis was carried out. The first stage of system analysis is needs analysis (Rothwell & Kazanas, 1997). The needs analysis is a method that determines whether the instruction is required for the target audience or not, and if so,

what kind of instruction is required. The needs analysis is taken as the determination of the current situation and presenting the intended situation. If there is an instructional problem, instructional designer attempts to determine the needs presenting the available situation (Ocak, 2011). Data were collected from the students, instructors and technical support group members who were the elements of systems in order to define the problems that the registered students experienced in distance education system; and needs analysis carried out. At the end of the needs analysis, the problems that newly registered students experienced were determined and solutions were recommended for the problems that could be solved with instructional methods. Within the scope of this study, the problems were found to be as instructional problem and related to the orientation process. Afterwards, considering that the problems might be removed by means of training, a prototype website was designed for the students. The recommendations of the participants were taken into account in terms of what and how would be presented as the content of the website. Meanwhile, online orientation programs developed by different universities for online courses were examined. In general, the programs included the information related to the nature of the distance education and technical requirements. However, it was also seen that the determination of the student competencies for taking an online course was also included in addition to the aforementioned information in some programs. All these data were taken into consideration while designing prototype website.

**Data Collection Tool and Process**

In data collection procedure, the data were collected by means of survey and interview forms. The survey was conducted in order to determine the problems students encountered from the registration stage to the online examination period. Within the scope of this objective, an item pool was created by the researchers and three instructional education experts were consulted. In the light of these opinions, some items were omitted and some were modified. The final form of the survey that was composed 23 items in 5-point Likert type scale was completed.

Additionally, semi-structured interview forms were also used as the data collection tool. The instructors and technical support group members were interviewed in order to determine the problems students encountered throughout the process. The interview questions were prepared by the researchers and experts were consulted in order maintain content validity. In the interviews with the instructors, the views related to what kind of problems newly registered students encountered in which stages, what kind of solutions were recommended and the content and the presentation of the possible orientation training were asked. In the interviews with the technical support group members, the questions related the problems experienced, the solutions for these problems and what could be done by the institution in order to make the orientation training more efficient were posed.

**Data Analysis**

In the analysis of the survey questions, frequency and percentage analyses were conducted in order to examine what kind of problems the students encountered. Via MAXQDA, content analysis was applied to the data set gathered through interviews.

## Findings

### The Findings Related to the Problems Encountered in the Orientation Process

The problems encountered in the orientation process were presented under three main themes as the problems encountered in registration, the problems encountered in online courses and the problems encountered in online course process.

**The Findings Related to the Problems Encountered in the Orientation Process.** The registration process included the main processes from how the students logged in to the distance education system to how the distance education courses were carried out. Within this framework, the main problems were determined in this stage through the questions asked to the students. The findings related to the problems are presented in Table 1.

**Table 1**

*The problems students encountered in registration process*

| Registration Process | Yes | | Partly | | No | |
|---|---|---|---|---|---|---|
| | f | % | f | % | f | % |
| Did you know how to access the course program? | 15 | 34.1 | 15 | 34.1 | 14 | 31.8 |
| Did you know how to access the courses? | 20 | 45.5 | 13 | 29.5 | 11 | 25.0 |
| Did you know how to get the username and password that you use to access the course system? | 19 | 43.2 | 12 | 27.3 | 13 | 29.5 |
| Did you have any idea on how the courses were going to be conducted? | 13 | 29.5 | 19 | 43.2 | 12 | 27.3 |
| Did you know how to reach people that you can get information about the system? | 16 | 36.4 | 18 | 40.9 | 10 | 22.7 |

When the problems that students encountered in registration process were examined, 31.8% of the students responded as "no" and 34.1 of them responded as "partly" to the question *"Did you know how to access course program?"* These findings indicated that students had problems in accessing the program in registration process. Moreover, when the responses given by the students to the question *"Did you know how to get the username and password that you use to access the course system?"* were examined, 29.5% of the students responded as "no" and 27.3% of them responded as "partly". To the question *"Did you have any idea on how the courses were going to be conducted?"*, 27.3% of the students responded as "no" and 43.2% of the students responded as "partly". Finally, when the question *"Did you know how to reach people that you can get information about the system?"* was examined, 22.7% of the students responded as "no" and 40.9% of them responded as "partly".

These finding indicated that most of the students experienced problems in terms of accessing the course program, getting username and password for the system and reaching people in order to get information about the course procedure and system during the registration process.

Similar findings were reached in the interviews with the technical support group members as well. The problems students encountered during the registration process are summarized in Table 2.

**Table 2**

*Students' problems in the registration process according to technical support group*

| The problems Encountered during the Registration Process | **f** |
|---|---|
| Misinformation or the lack of information about what distance education is | 4 |
| Username and password problems | 4 |
| The problem of accessing course interface | 3 |
| The problem of accessing course program | 2 |
| The lack of knowledge about the required software and hardware | 2 |
| The problems caused by the student information system | 2 |
| Not knowing the person who is responsible for the problem | 2 |

All of the technical support group members interviewed stated that the main problems encountered during the registration process was that the students did not have any idea or they had misinformation about the distance education. It was particularly mentioned that the students had misconceptions about open education and distance education and they had misconceptions like those that they did not have compulsory attendance and they would take the examinations in exam periods after studying printed materials. The other problem was that students confused their usernames and passwords for online courses with the ones they used for the student information system. In addition to this, the problems such as not knowing how to reach the course interface (f=3), not reaching course schedule (f=2), lack of knowledge about the minimum requirements of the distance education system (f=2) and the problems related to the student information system (f=2) were also mentioned. Moreover, not knowing whom or which unit they should contact when they encountered a problem was another problem (f=2). Some statements of the technical support group members related to this process are presented below.

> The students who are registered for distance education do not actually have enough knowledge about what distance education is andhow the courses will be conducted. At first steps, the problems related to the username and passwords are experienced. They also have some problems while using the system used for the courses (...) (T1)
>
> (...)One of the most important problems that we experience is that students call us for all questions and problems. They also ask us the questions which they actually should ask the course instructor and student affairs office. This is a big problem, I think. (T2)
>
> Some students call us in order to ask what they should do after the registration. They would like to get information whether they will be given any printed material and there is compulsory attendance or not. Although, we inform that they have compulsory attendance, they state that their friends enrolled at open education did not have this kind of obligation. The first thing that generally comes to their mind when distance education is mentioned is the open education system. Firstly, we inform them about the program they are enrolled in, and then, we tell them how they could follow the courses on the Internet and what the technical requirements are for following the courses (…) (T4)

As for the interviews with the instructors, it was stated that there were not too many problems expressed by the students related to the registration process. They only mentioned that they had had problems about getting information about the distance education and not knowing which department they should have consulted about their problems. A statement about this process from a instructor is presented below.

> As distance education students are away, they do not know the procedures here. They are not aware of the fact that everyone is responsible for different duties. Mostly, course instructor is in front of them and, I think, they believe that course instructors are responsible for all questions and problems. In years, they become more conscious... They do not know what to do in procedural situation (I1)

**The Problems Encountered in Online Course Process.** Online courses are the courses on the internet in which the students and the instructors joined synchronously. The students were expected to use information and communication technologies at the basic level so that the courses were carried out effectively. Within this framework, the problems the students encountered in live courses are presented in Table 3.

When the data related to the problems encountered in online course, it was seen that 36.4% of the students responded as "no" and 25.0% of them responded as "partly" to the question *"Did you know how to control voice before the course?"*. Another question was *"Did you know how to take turn in the online course?"* and 36.4% of the students responded as "no" and 18.2% of them responded as "partly". To

the question *"Did you know how to send voice?"*, 31.8% of the students responded as "no" and 27.3% of them responded as "partly". Another question was *"Did you know how to send video?"* and 40.9% of the students responded as "no" and 22.7% of them responded as "partly". To the question *"Did you know how to share your screen?"*, 59.1% of the students responded as "no" and 13.6% of them responded as "partly". Finally, to the question *"Did you know whom to reach when there was a problem in a online course?"*, 36.4% of the students responded as "no" and 13.6% of them responded as "partly".

**Table 3**
*The problems students encountered in online courses process*

| During the Online Course | Yes | | Partly | | No | |
|---|---|---|---|---|---|---|
| | f | % | f | % | f | % |
| Were you able to access the system with your username and password without any problems? | 31 | 70.5 | 5 | 11.4 | 8 | 18.2 |
| Did you know how to reach the announcements about the courses? | 20 | 45.5 | 16 | 36.4 | 8 | 18.2 |
| Did you know how to reach the weekly course schedule? | 26 | 59.1 | 14 | 31.8 | 4 | 9.1 |
| Did you have any idea about the infrastructure (the requirement of the ADSL connection, etc.) in order to access the online courses? | 31 | 70.5 | 10 | 22.7 | 3 | 6.8 |
| Did you know the required hardware in order to access the online courses? | 29 | 65.9 | 10 | 22.7 | 5 | 11.4 |
| Did you know how to control voice before the course? | 17 | 38.6 | 11 | 25.0 | 16 | 36.4 |
| Did you know how to take turn in the online course? | 20 | 45.5 | 8 | 18.2 | 16 | 36.4 |
| Did you know how to send voice? | 18 | 40.9 | 12 | 27.3 | 14 | 31.8 |
| Did you know how to send video? | 16 | 36.4 | 10 | 22.7 | 18 | 40.9 |
| Did you know how to share your screen? | 12 | 27.3 | 6 | 13.6 | 26 | 59.1 |
| Did you know the private chat which is used for one-to-one communication in the course? | 22 | 50.0 | 6 | 13.6 | 16 | 36.4 |
| Did you know whom to reach when there was a problem in a online course? | 15 | 34.1 | 13 | 29.5 | 16 | 36.4 |
| Did you know how to access the content shared in online course? | 23 | 52.3 | 9 | 20.5 | 12 | 27.3 |
| Did you know how to access the video recordings of the courses you could not attend? | 25 | 56.8 | 9 | 20.5 | 10 | 22.7 |

These findings indicated that students had problems in terms of voice control, turn taking, voice transferring, video transferring, screen sharing and reaching someone for technical problems during the online course process. It was also seen that the students did not have too many problems when the items related to the online examination procedure.

The similar findings were also obtained in interviews with the technical support group members. Within the framework of the interviews, the problems students encountered in online courses are presented in Table 4.

**Table 4**
*Problems student encountered in online course process according to technical support group*

| The Problems Experienced in Course Process | f |
|---|---|
| The problems related to the use of online course system (voice, video etc. technical problems) | 4 |
| Communication problem with the instructor | 3 |

The main problems students experienced in online courses process were expressed as the problems related to the use of online course system (f=4). These problems were about not being able to share their voices or videos or having problems in screen and file sharing. Moreover, it was stated that the students could only communicate with their instructors in online courses and this was not enough; or they did not know how to communicate with their instructors after school or they could only communicate via e-mail (f=3). Some statements of the technical support group members about this process are presented below.

> During the online courses, the most important problem occurred at the beginning of the semester resulted from students' not knowing how to use the system, and in addition to this, they did not read the documents provided. Particularly, the students with low level of computer competence could not use the course system effectively. They call for help when they could not transfer their voices or they had problems in file sharing. They stated that they could not receive their instructors' voices or videos because of some technical problems in their connection or their computers. Infact, these problems occurred as the students did not know the system requirements. When the individuals connect to the system via mobile internet instead of ADSL, they inevitably experienced problems because of the the data transfer speed (…) (T3)
>
> Some students call us in order to reach the instructors. "I should ask a question about my assignment to the instructor A, how can I reach him/her. … I sent an e-mail message but s/he hasn't still replied." Some students stated that they had problems in communicating with the instructor; this was related to students themselves; but on the basis, this resulted from the fact that they could not use the system effectively. Because of some drawbacks like "How can ask to speak? How can I transfer my voice? etc. (…) (T1)

It was seen that the problems about using the system tools were more common related to this process in the interviews with the instructors.

> The students might have problems in transferring the voice or sharing the screen in early courses (…)(I2).
>
> Actually, the students had mainly two problems; one of them was about not knowing how to use the tools in the system (…). Firstly, they should have known how to use this system. In order to overcome this problem, I provided the opportunities with the students to experience. There were some guidelines for using these systems; but unfortunately, our students did not read these (I4).

**The Problems Encountered in Online Examination Process.** Online examination process is the process in which the evaluation takes on the Internet. This process requires to have some basic competencies like reaching the system with a username and a password and recording the responses for the questions in the examination. Within this framework, the problems students experienced are presented in Table 5.

**Table 5**
*The problems student encountered in online examination process*

| Online examination process | Yes | | Partly | | No | |
|---|---|---|---|---|---|---|
| | f | % | f | % | f | % |
| Did you know how to access the exam interface? | 24 | 54.5 | 10 | 22.7 | 10 | 22.7 |
| Did you know how to get the username and password which you were going to use in exam entrance screen? | 27 | 61.4 | 14 | 31.8 | 3 | 6.8 |
| Did you know how to save in order not to lose any information during the exam? | 28 | 63.6 | 10 | 22.7 | 6 | 13.6 |
| Did you know how to send the information after you completed the exam? | 27 | 61.4 | 9 | 20.5 | 8 | 18.2 |

When the items related to the problems experienced in online examination process, it was seen that the students did not have too many problems. This might be resulted from the fact that the students attended a pilot test on the Internet before the online examination. The fact that they attended such kind of pilot test might have helped the students to gain experience against the possible problems in online examination process. The problems experienced in online examinations mentioned in the interviews with the technical support group members are presented in Table 6.

**Table 6**
*Problems encountered in online examination process according to technical support group*

| The problems encountered during the examination | f |
|---|---|
| Username and password problem | 3 |
| Not being able to control whether the exam responses were sent or not | 2 |
| Technical problems in examination process | 2 |

When Table 6 was examined, it can be seen that the problem related to forgetting username/password occurred as the students did not log in to online examination interface frequently (f=3). Moreover, some problems related to recording the responses accurately or not appeared (f=2). Besides all these problems, the problems related to the some technical problems (power cut or internet outage) (f=2) during the online examination were taken under this category. Some statements taken from the interviews with the technical support group members are presented below.

> (…) furthermore, some students had problems in online examinations because of the powercut or the internet outage and they could not go on since they had not saved their responses by then. Therefore, some problems occurred during the examinations. However, the problems related to the examinations usually occurred in the first examinations. I think, the number of problems decreased in time as the students gained experience (T2).
>
> Some students tried to log in the examination interface just in examination time. In this situation, we might have some problems if the students had forgetten their usernames or passwords or if they had changed their passwords before.One of the most posed question during the examination period was whether the responses were recorded in the system or not. Although the students received an information message about the successfully completion of the process, they felt the need to call and ask. This appeared in the first examinations more frequently (T4).

It was mentioned that there were some problems about the use of online examination system in the interviews with the instructors. However, as the technical support group members were more active in this process, the instructors stated that they had only received problems related to the grades. Some statements taken from the interviews with the instructors are presented below.

> (…) moreover, they might have some problems in the first online examinations (I2).
>
> As the online examinations were organized centrally, I do not know the exact problems experienced in this process; but the students who could not complete the exam because of power cut or any other problems come to us. I think, this might be a problem in this process. Additionally, some students claimed that they did well in the examination; however, their responses were not recorded. In this kind of situations, we contact the technical support group members and check this (I3).

**Recommended Solutions for the Problems**

In this section, the recommended solutions for the problems mentioned in the interviews with the instructors and technical support group members are presented. The recommended solutions that the technical support group members suggested:

- An orientation on how to use the system should be given at the beginning. They might be informed about the use of system.
- Documents might be prepared on how to use the system effectively.
- The usernames and passwords might be delivered through SMS or sent personally to their e-mail addresses.

- The databases for the student information system and distance education center should be common and the former should be a system which includes the required information for the distance education center synchronously.

Most of the instructors thought that orientation training should be offered as the solution for the problems. When the sources of the institution and the number of students were taken into consideration, training on the Internet by means of a well-designed web interface would be more useful rather than face-to-face orientation training. Their views on how an effective training should be designed are presented below;

- Information on distance education should be provided.
- It should be explained how the courses would be taught in distance education.
- Information on the distance education units and the responsibilities of these units should be provided.
- The student affairs regulations of the institution should be presented.
- Information about the frequently asked questions should be given.
- Social networks should be suggested for communication among all registered students.
- More contact information (e-mail address, etc.) about the instructors should be placed on the website.

In the light of the findings of this study, a sample website was designed for the orientation training. The website, which was prepared based on the findings of the study and the recommendations of the instructors, was designed within the framework of the modules in Fig. 2.

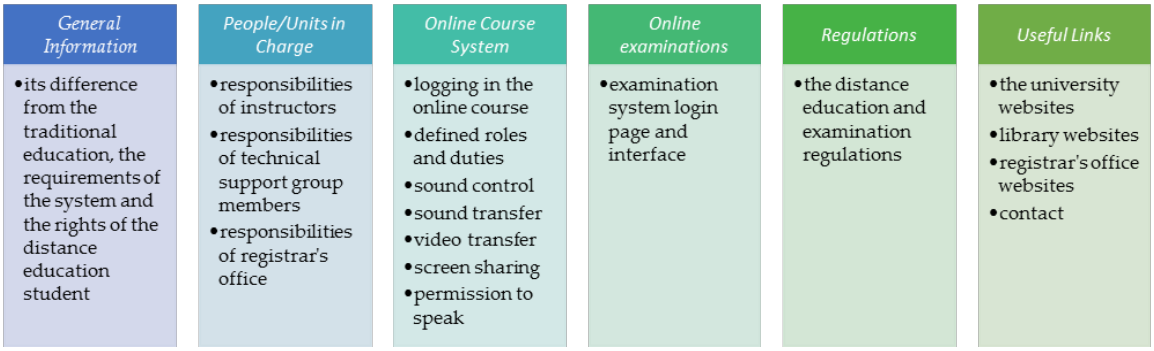


Fig. 2. Student Orientation Training Modules

*General Information:* In this section, general information on what distance education was, its difference from the traditional education, the individuals that could join, the requirements of the system and the rights of the distance education students.

*People/Units in Charge:* In this section, the pages related to the definitions of the people and units were available. The responsibilities of instructors, technical support group members and student affairs were presented in these pages. Thus, it was aimed at informing students upon whom they should reach when they experienced any problems.

*Online Course System*: In this section of the website, the students were informed about logging in the online course system, the defined roles and duties, sound control and transfer, video transfer, screen sharing and asking for permission to speak. The processes were described with videos, texts and visual flow charts. Utilizing various materials in this way, it was aimed at decreasing the problems of the students about these processes.

*Online examinations:* In this part, video, text and flow charts were prepared in order to remove the problems encountered during the online examination, which was one of the important components of distance education, and it was aimed at informing students about the process before the instruction. By means of the materials prepared in this manner, it was aimed at informing students about the examination system login page and interface.

*Regulations:* In the regulations section of the website, it was aimed at informing students about the distance education and examination regulations.

*Useful Links:* In useful links section, some links about the university, library and student affairs websites were shared. Through these sharings, students were expected to reach the related websites easily.

Besides information sharing on the website, an evaluation, which was parallel with the content of the orientation training, was designed in order to evaluate the students' achievement in orientation training. By means of this evaluation, the levels of students' completing orientation training were determined. The students with low level of achievement were asked to receive the training again and so that it was aimed at experiencing less problems in the process. The students with high level of achievement were allowed to move to the instructional process.

In the light of these recommendations, the snapshot of the prototype website for the orientation training that would be offered on the Internet within the body of distance education center was presented in Fig. 3.

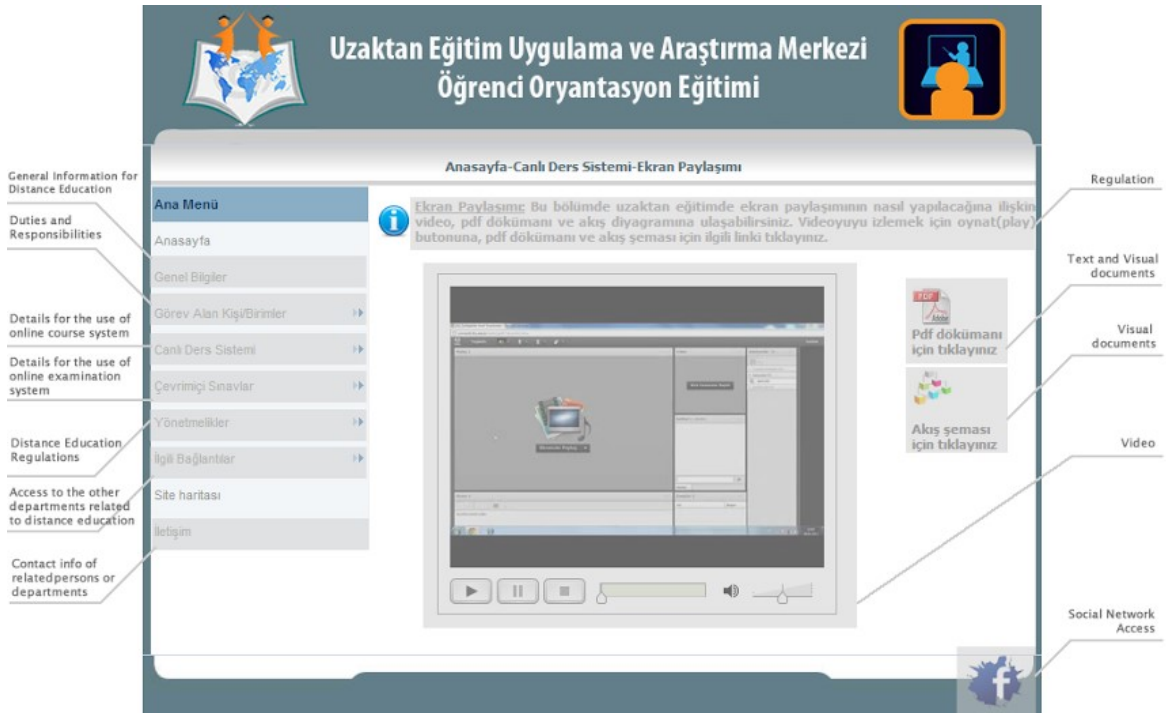


Fig. 3. Screenshot of the sample website design for the orientation training

## Conclusions and Suggestions

In this study, it was aimed at determining the problems encountered in the orientation process in distance education and to provide solutions for these problems. At the end of the study, the problems students encountered in distance education process were grouped as during the registration process, the online course process and the online examination process.

The findings obtained from the surveys carried out with the students indicated that students had problems in accessing the course program, getting username and passwords in order enter the system, course procedures and reaching the people whom they could get information during the registration process. It was found that they had problems in terms of voice control, turn taking, voice transferring, video transferring, screen sharing and reaching people about the technical problems during the online course process. Similarly, in a study by Muilenburga and Bergea (2005), in which the problems students encountered in online learning processes were examined, it was stated that various factors affected this process and technical problems were one of these factors. Orientation training for these problems might be provided. Hence, in a study carried out by Mensch (2009), it was mentioned that the awareness of the students about the utilized technologies would increase by means of orientation training and the problems would decrease. Moreover, it was observed that a great number of students did not have problems when the items related to the online examination process were examined. This might be caused by the fact that distance education unit carried out some piloting test in order to ease the use of the system.

The findings obtained from the interviews with technical support group support the results of the survey. In addition to these problems, it was also found in the interviews with the technical support group that there were other problems such as students did not have enough knowledge or misinformation about what distance education was, they did not have enough knowledge about the required software and hardware and they did not know who was responsible for the problems they experienced.

The interviews with the course instructors indicated that the students had problems in terms of not knowing the procedures, having difficulties in using online course, having difficulties in online examinations and not knowing where to report the problems they encountered.

At the end of the interviews, it was seen that orientation training was important for the newly registered students. When the literature was reviewed, an online orientation training was recommended for the encountered problems (Ali & Leeds, 2009; Lee & Choi, 2011; Wojciechowski & Palmer, 2005). A program was developed by Cho (2012) for the online student orientation in higher education. This program, in moduler structure, was considered useful for the students receiving online instruction.

When the problems were examined in this study, it was predicted that each problem could be taken as an instruction problem. As in Cho's (2012) study, it was thought that each instructional problem might be removed by means of an orientation training offered online. It was also thought that it would be more appropriate to offer the orientation training on the Internet as the number of students in distance education was high; and this would decrease the efficiency of the orientation training in face-to-face trainings and the cost of printed materials would be higher. Within the framework of the determined problems, a prototype web-based orientation training, which aimed at each problem, was designed using different multi media elements.

In further studies, online orientation training might be provided using the developed prototype and its effectiveness might be examined. A comparison between two groups receiving orientation and not receiving orientation might be made; and it might be measured whether there was a difference in terms of several variables, like achievement and satisfaction.

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