

Educational Videos through LMS for Improvement in Non-Cognitive Skills of Computer Science Students

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ABSTRACT: The LMS is an e-learning platform that allows students to familiarize their learning in line with instructional goals. LMS facilitates learners by giving access to learning tools and resources to enrich their learning. While several studies can be spotted on LMSs supporting students' learning and enriching students' cognitive and affective skills, the most common gains of student learning from LMS are measured in terms of students' performance satisfaction, motivation and self-efficacy. There is a call for more research that empirically examines theoretically grounded constructs of learning and motivation in the context of learning with the use of LMS. The primary objective of this paper is to assess the gain of the non-cognitive skills namely Attention and Motivation through Educational videos, Confidence for Communication and Self-learning capability by participating in a course through LMS Moodle. Conducive environment is created as a part of a research project; the assessment is done by a methodically designed questionnaire for each skill. The questionnaires are administered at the completion of the course. The results are analyzed for testing the hypotheses formulated.

KEYWORDS:

LMS – Learning Management System, OOM – Object Oriented Methods,
ARCS Model – Attention Relevance Confidence Satisfaction Model
QAMLM – Quality Assurance for Multimedia Learning Materials
OOPS – Object Oriented Programming System

I. INTRODUCTION

Advances in ICT and Elearning empowers learners and teachers to engage in synchronous and asynchronous interaction across space, time, and at their own pace (Reddy, 2018). Many higher education institutions and educational technology companies are using them as a self-study medium or as tool to enhance the learning process" (Vieira et al. 2014).

According to MEITY (2018), "E-Learning is the mode of learning facilitated and supported by Information Communication technologies (ICT)". E-learning mode and the related tools provide a platform for enhanced learning, cost effective delivery, flexibility of learning at the convenience of the learner, uniform quality content delivery, re-usability of the content etc.

Elearning can be defined as the mode of education in which different types of delivery of education, activities related to instruction, teaching, and learning are accomplished using various electronic media, such as Internet, Intranets, Extranets, Satellite TV, Video/audio tape, and/or CD ROM (Koohang & Harman, 2005). The goal of Elearning is centered on relieving the constraints that learners face in the traditional residential/physical educational systems where they are expected to physically present to attend the lectures (Willems, 2005).

Learning Management System (LMS) is the most popular Teaching and Learning strategy in instructional technology promoted by internet. Learning Management Systems (LMS) consists of suite of software tools that enable the management and facilitation of a range of learning and teaching activities and services. A Learning Management System is a software application that carry out tasks like Administration, Documentation, Tracking, Reporting and Delivery of electronic instructional technology courses or training programs (Sarfo et al., 2016).

I.1 IMPORTANCE OF NON-COGNITIVE SKILLS

One quantifiable benefit to increased motivation is that students tend to spend more time on tasks when on the computer. More time is frequently cited as a factor in achievement. Also, using a variety of multimedia components in one program or course has been shown to increase student interest and motivation (Jonita, 2002).

Student-centered instruction can foster improvements in the intrinsic motivation of students if properly designed and implemented. Principles to remember in the design process include using flexible deadlines, engaging in less overt supervision in order to increase student independence, promoting a safe and risk-friendly learning environment, and providing students with choice and control over instruction (Lashaway-Bokina, 2000). Problem-solving activities can be some of the most effective methods for using student-centered instruction to enhance intrinsic motivation. Problem solving can be combined with other student-centered methods through the use of simulations. Simulations have been found to lead to engaging learning experiences, but students need time to reflect upon their learning experiences in order to achieve improved academic outcomes to accompany the motivational benefits. This indicates the importance of quality instructional design for improving student learning outcomes (Brophy, 2010).

In addition to the fact that computers do not always lead to positive results in terms of student motivation, not all computer related activities lead to the same outcomes. Research studies report that students did not indicate equal motivation or enjoyment from all computer-based lessons. The data gathered through focus group interviews of students led to the conclusion that simulations and games were very popular while applications such as spreadsheets were not interesting or motivating for students. This strengthens the argument for a combination of student-centered and technology-based methods in order to affect an improvement in the intrinsic motivation of secondary students.

Intrinsic motivation is important to students and teachers because of its effect on learning outcomes. Motivation is a significant predictor of academic performance which leads to the conclusion that intrinsic motivation is a major factor in determining academic success. Intrinsic motivation can change based on the learning context. The learning context includes instructional design as well classroom design and atmosphere.

Visuals can also be utilized to challenge students to think on levels that require higher order thinking skills. Finally, technology provides opportunities for teachers to meet the needs of students with various learning styles through the use of multiple media (Bryant & Hunton, 2000).

II.A RELATED WORK

Even though the distance mode of education ensures great level of freedom from time, place and pace of study, it has several limitations (Moallem, 2004). The LMS is an e-learning platform that allows students to familiarize their learning in line with instructional goals, and it allows learners to gain access to learning tools and resources to enrich their learning (Cheng, 2014; Rodrigues, 2011). . (Azevedo, Cromley, & Seibart, 2004; Asiri et al., 2012; Cerezo et al., 2016; Mo, 2015; Hamat, 2014; Luck, et a., 2012; Rymanova et al., 2015; De Smet et al., 2016; Sung & Mayer, 2015; You, 2016). The most common gains of student learning from LMS are measured in terms of students' ISSN 2094-1420 attainment and performance (Cerezo et al., 2014; De Smet, 2016; Luck, et al., 2012; You, 2016; Sung (Volume 12, March 2017 The International Journal of Research and Review 86 © 2017 Time Taylor International & Mayer, 2015), satisfaction (Naveh, 2010), self-regulated learning (Moos & Azevedo, 2008), motivation (Moos & Azevedo, 2006), and self-efficacy (Murphy & Alexander, 2000). There is a call for more research that empirically examines theoretically grounded constructs of learning and motivation in the context of learning with the use of LMS (Lepper & Wolverson, 2004). One of the major indicators of student learning is their performance overtime after the use computer-based learning environments such as the LMS. The performance is determined as a result of the material and competencies presented to learners in e-learning. Students' performance is usually a cognitive measure manifesting what students have achieved after interacting with LMS.

II.1 ATTENTION ANDMOTIVATION

The expectation from any learning content and experience is the extent of 'engagement' it achieves or the attention of the student it is capable of drawing. A better learning experience will be achieved when student attention is drawn and subsequently maintained at the substantial high level throughout the video content. Analyzing the components of Student engagement which comprises of ABC Affective, Behavioral and Cognitive aspects of engagement will be useful in constructing the instrument to measure Student attention.

Cognitively engaged students would seek to go beyond the requirements, and would enjoy challenges (Trowler & Trowler, 2010). Hence the basic construct involved in framing questions around this level were with regards to time spent in understanding the materials, whether they developed useful techniques to learn new content and whether they were actively involved in most class learning experiences.

The affective component of student engagement involves discovering different ways to respond to learning tasks. Students who engage emotionally would experience affective reactions such as interest, enjoyment, or a sense of belonging (Trowler & Trowler, 2010). It covers feedback received from teachers as well as confidence to do well in class. The questions that covered the affective domain covered these areas.

The third engagement component concerns the students’ behavioral or psychomotor actions to the task. Students who are behaviorally engaged would typically comply with behavioral norms, such as attendance and involvement, and would demonstrate the absence of disruptive or negative behavior (Trowler & Trowler, 2010). The important issue for students involves the shared actions to learning tasks with respect to working with the peer-group, faculty and discussing ideas outside class. This was kept in mind when framing questions belonging to the behavioral level Falleiro, S. S.(2013).

Subsequently, though the initial success of a learning content is in drawing and then retaining the attention of the student, the effort is fruitful only when the content can motivate the student as motivation done helps the student remember the content and works as the source of inspiration for the student to achieve good to great results. Student Motivation is based on ARCS i.e., Attention, Relevance, Confidence and Satisfaction model of instruction.

Keller’s model contains four categories of motivational variables: attention, relevance, confidence and satisfaction (ARCS). ARCS Model is widely applied to the production instructional material due to its connectivity between learning motivation theories and instructional design and development processes (Huang & Johnson, 2008). Given below are the four ARCS factors (Keller, 1988):

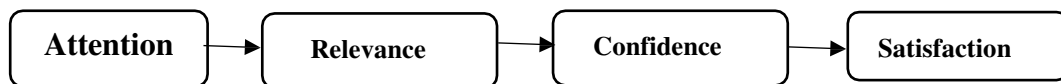


Figure 1: Keller’s ARCS Model

ARCS Model:- Capture the learner’s Attention at the start of the lesson and maintain it throughout the lesson; Report to learners of the importance of the lesson and how taking the lesson could benefit them; Employs strategies like ‘design on the basis of success’ and inform learner of the lesson expectations; Provides feedback on performance and allow learners to apply what they learn in real-life situations.

Based on ARCS model, the Motivation may be linked to four different motivation levels. The Attention component of student motivation in ARCS model has been conceptualized in a variety of ways, but the basic constructs involved around focusing on whether the students found what they are learning interesting, whether they found things that stimulated the curiosity and whether the variety of reading passages, exercises or other comments helped keep the attention of the students.

The relevance component of student motivation involves questions that centered on the ability of the student to learn and perform better. The statements under this section covered understanding, importance and usefulness of learning what is being taught. The third motivation component concerns confidence and focuses on the ability of a student to learn and perform better, the confidence level of the student and expectation to do well in assessments. The questions on the satisfaction component of ARCS focus on the students’ ability to satisfactory complete and enjoy the learning process

II.2 CONFIDENCE FOR COMMUNICATION

For gaining communication skills, the primary requirement is the Confidence for Communication and comes next the willingness to contribute and listen. Next comes the language skills. The exposure to the subject-based vocabulary or terminology and usage in the context in the video, text lessons and in the quiz and assignment provides them an exposure to the terminology.

In colleges, where more students can be seen from less-educated or less-motivated backgrounds, students can be observed to have a starting trouble in communication. Even when asked a question or when asked to express doubts at the end of a session, proper response might not be received. The reasons for these can be any one or more of the following. In a physical classroom, a student may have inhibitions like

- i. The other students or teacher may mock at their language
- ii. The other students or teacher may mock at their subject knowledge & exposure
- iii. The other students may mock at them for acting ‘studious’

In an online LMS-based classroom, there is little chance for these conflicts to occur. Moreover, the chat, news forum and the topic-based forums where mainly they are interacting provides them an opportunity to contribute to the discussions in the word level or phrase level or sentence level. Such a 'start' is important for the Confidence. It is a known fact that any person gains a skill by just one magic that is 'practice'. Hence the further expectation is that when the students start talking with friends on a topic, getting due encouragements then and there in the form of appreciation, they gain more confidence and speak with teachers, then get ready to speak with experts or with any new person. This gradual development which starts with engagement and proceeds with motivation has to be measured. Hence, a few attributes from engagement scale and more from motivation scale are considered to construct this instrument to measure the gain of confidence for communication.

II.3 SELF-LEARNING CAPABILITY

Self-learning is vital in the competitive world of today to thrive at any stage of career; whilst opportunities are more, amid no limit on how much one needs to learn and qualify, the benefits of self-learning capability can be assured. At college, in spite of excellent faculty and a surplus faculty-student ratio, students might experience difficulty in following the teaching-learning process due to variety of distractions starting from societal to personal where Self-learning would help. It would be better to start self-learning during an internship or an employment where Self-learning capability becomes crucial.

II.B NEED FOR THE STUDY

Aside from cognitive outcomes, there are identified non-cognitive constructs that are developed during and after exposure to LMS. This non-cognitive outcome includes self-regulation (see Moos & Azevedo, 2008; Magno & Ocampo, 2015), engagement (Howard et al., 2015; Rashid & Asghar, 2016), and motivation (Mayer, 2014). These non-cognitive factors such as self-regulation, engagement, and motivation were studied with achievement and experimental designs with various traditional instructional interventions. They need to be studied extensively within a computer-based learning if they develop in the same pattern using traditional instructional support (Rashid & Asghar, 2015).

It is notable in studies that students develop specific skills while going through lessons that are delivered via LMS as explained by the cognitive affective multimedia learning (Brunken, Plus, & Moreno, 2011). These non-cognitive skills include self-regulation, motivation, and engagement.

II.C OBJECTIVES

- To assess the student gain of Attention and Motivation by attending video-based lessons
- To assess the student gain of Confidence for Communication by taking up the activities in LMS
- To assess the student gain of Self Learning Capability by taking up the activities in LMS

II.D HYPOTHESES

Based on the objectives of the study, following hypotheses are framed:

To compare the performance of the students in terms of three aspects based on the scores in the previous exams gain of Attention & Motivation, Confidence for Communication, Self-learning capability.

- a) There is no significant difference in the mean value for the variable "Attention and Motivation" gained by listening to the video content among respondents with different level of performance in terms of their academic grade.
- b) There is no significant difference in the mean value for the variable "Confidence for Communication" among respondents with different level of performance in terms of their academic grade.
- c) There is no significant difference in the mean value for the variable "Self-learning capability" among respondents with different level of performance in terms of their academic grade

III. METHODOLOGY

III.1 RESEARCH METHODOLOGY

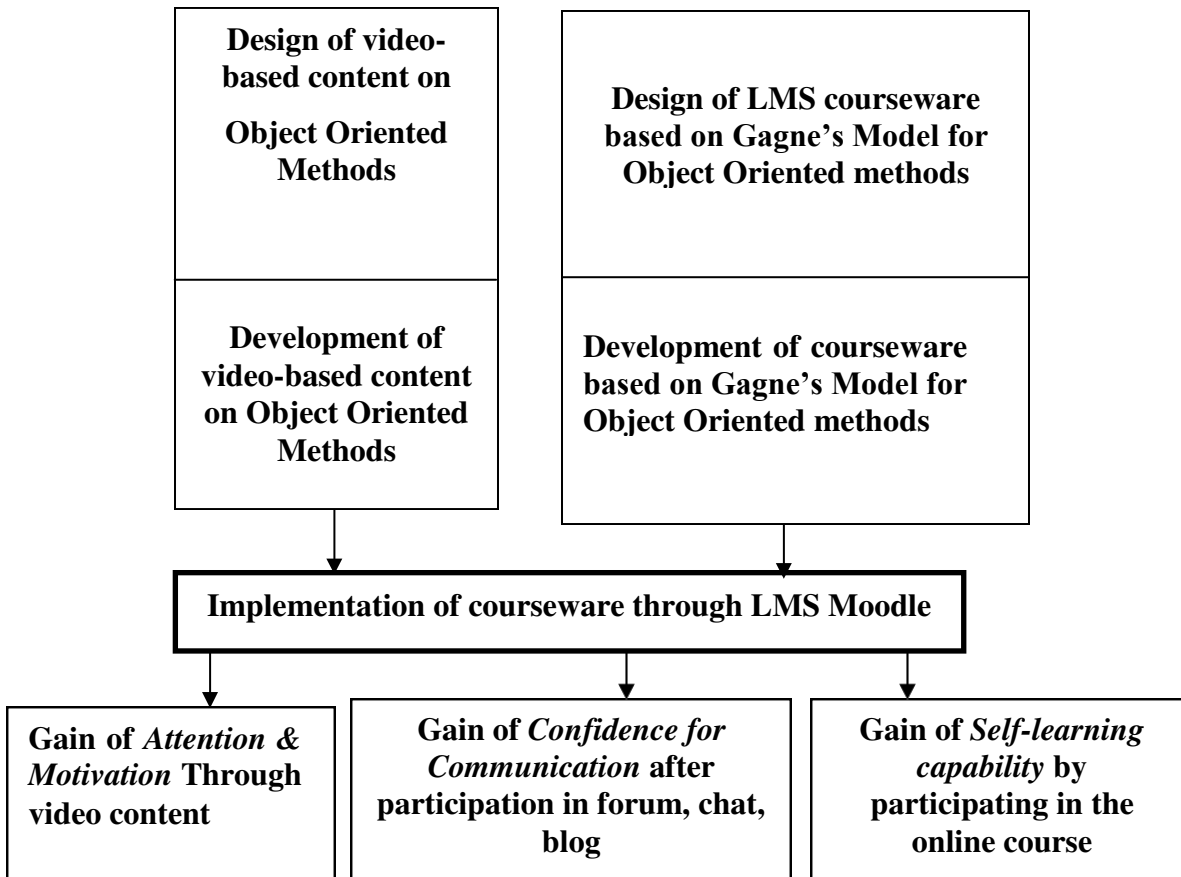


Figure 2: Research Methodology

III.2 RESEARCH PREPARATIONS

- Video lessons were designed, developed and prepared for delivery through LMS after being validated by experts through a questionnaire with criteria from Quality Assurance for Multimedia Learning Materials (CEMCA,2010)
- Activities in LMS were designed based on Gagne’s 9-step model, with revised Blooms Taxonomy used to design questions for formative evaluations
- Implementation plan and preparations
- Design of questionnaires for self-assessment of student gain of non-cognitive skills - Reliability and validity tested

**QUESTIONNAIRE FOR SELF-ASSESSMENT OF GAIN OF ATTENTION AND MOTIVATION THROUGH THE VIDEO- BASED COURSE THROUGH LMS MOODLE
ATTENTION AND MOTIVATION**

Based on the characteristics described in Section II.1, the criteria can be formulated to create the questionnaire to measure motivation. Considering the engagement and motivation aspects, the gain of the attitude ‘Attention and Motivation’ as a result of viewing the video can be assessed. The questionnaire to measure the effectiveness of the video is hence formed using the 9 characteristics to assess the gain of Attention and Motivation by listening to the

video content listed as:-

- i. Stimulation of curiosity
- ii. Quality helping to hold attention
- iii. Appease
- iv. Element of surprise
- v. Presentation enabling ease of understanding
- vi. Enjoyable when recollected
- vii. Content matching student's personal interest
- viii. Inspiration for software development
- ix. Inspiration for video content development

Each of these statements was rated on a scale of 1 to 5. The questionnaire to measure Attention and Motivation was prepared on five point Likert-type scale and the objects labeled as:

Strongly disagree : 1, Disagree : 2, Neutral :3, Agree : 4, Strongly agree : 5.

VALIDITY AND RELIABILITY

Validity was tested by qualified and competent Professors. The reliability of the "Attention and Motivation" questionnaire was tested by calculating Cronbach Alpha Coefficient. The value of Cronbach Alpha was 0.78 which is better than acceptable limit of 0.6.

Reliability of the survey instrument is the measure to determine the consistency of similar measures in a scale in producing similar results (Rosenthal & Rosnow, 1984). It has two dimensions, namely, repeatability and internal consistency. Internal consistency refers to the ability of a scale item to correlate with other items in the scale that are intended for the measurement of the same construct. Items measuring the same construct are expected to be positively correlated with each other. A common measure of internal consistency of a measurement instrument is Cronbach's alpha (Cronbach, 1951). In general, a scale is considered reliable in measuring the construct, if the Cronbach's alpha value is greater than 0.7 (Nunnally, 1978).

QUESTIONNAIRE FOR SELF-ASSESSMENT OF GAIN OF CONFIDENCE FOR COMMUNICATION BY ATTENDING COURSE THROUGH LMS MOODLE

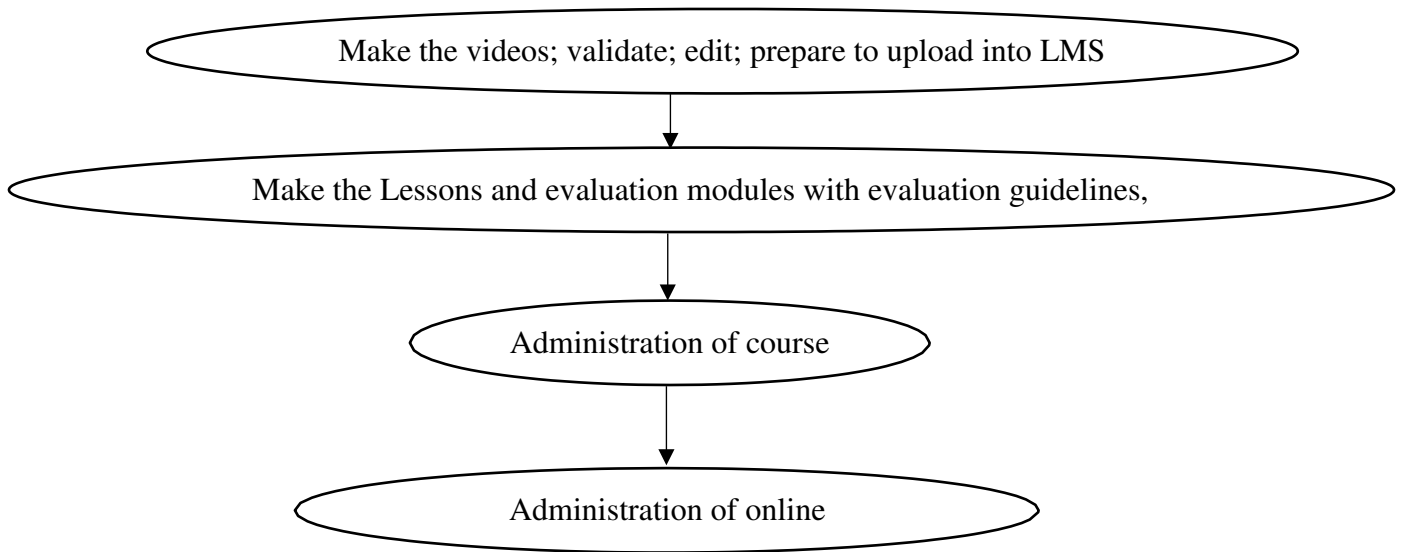
CONFIDENCE FOR COMMUNICATION

Based on the characteristics of engagement and motivation, it is understood that, Confidence is an affective aspect which causes Engagement, Challenge of expression is created by Cognitive engagement and the interest and initiative to share the learning experience, and Interactions show the Behavioral engagement. Hence with characteristics from engagement aspects and ARCS instructional model of Motivation, the characteristics for gaining Confidence for Communication are located. The following 11 characteristics comprise the assessment of the gain of Confidence for Communication by participating in the activities of the LMS Moodle.

- i. Encouragement for active participation
- ii. Variety of resources and activities retaining attention
- iii. Participation in small group discussions –starters
- iv. Initiative to interact with teachers to review assignments, tests or to ask doubts
- v. Contribution to discussions through questions
- vi. Challenge to express
- vii. Motivation to complete tasks for future
- viii. Satisfaction in activity completion
- ix. Gain of confidence to express ideas through discussion forum participation
- x. Feedback and comment
- xi. Confidence and interest to share the experience with others

Each of these statements was rated on a scale of 1 to 5. The questionnaire to measure Confidence for Communication was prepared with a five point Likert-type scale and the objects labeled as:

Strongly disagree : 1, Disagree : 2, Neutral :3, Agree : 4, Strongly agree : 5.



Research Procedure

VALIDITY AND RELIABILITY

Validity was tested by qualified and competent Professors. The reliability of the “Confidence for Communication” questionnaire was tested by calculating Cronbach Alpha Coefficient. The value of Cronbach Alpha was 0.86 which is better than acceptable limit of 0.6.

QUESTIONNAIRE FOR SELF-ASSESSMENT OF GAIN OF SELF-LEARNING CAPABILITY BY ATTENDING THE VIDEO-BASED COURSE THROUGH LMS MOODLE SELF-LEARNING CAPABILITY

Validity was tested by qualified and competent Professors. The reliability of the “Confidence for Communication” questionnaire was tested by calculating Cronbach Alpha Coefficient. The value of Cronbach Alpha was 0.86 which is better than acceptable limit of 0.6.

- x. Enjoying discovery of new ways for task completion
- xi. Trying to get the association between unknown to known
- xii. Developing useful ways to learn
- xiii. Active participation in class activities
- xiv. Ability to find ways to make the course interesting
- xv. Confidence to self-learn and perform well
- xvi. Interest to extend the experience gained to other subject learning
- xvii. Scoring of the variable

Each of these statements were to be rated on a scale of 1 to 5. The questionnaire to measure Self-learning capability was prepared with a five point Likert-type scale and the objects labeled as: Strongly disagree : 1, Disagree : 2, Neutral : 3, Agree : 4, Strongly agree : 5.

SAMPLING PROCEDURE

This study has the objective of examining the effectiveness of LMS Moodle using a quasi- experimental design. There was a need to locate institutions where there was a feasibility of giving a one week online course to the students through an LMS.

Purposive sampling method was chosen for the experimental study. Purposive sampling techniques are primarily used in qualitative (QUAL) studies and may be defined as selecting units (e.g., individuals, groups of individuals, institutions) based on specific purposes associated with answering a research study's questions. Maxwell (1997) further defined purposive sampling as a type of sampling in which, "particular settings, persons, or events are deliberately selected for the important information they can provide that cannot be gotten as well from other choice" (Tedlie & Yu, 2009; Palinkas et al., 2013). 10 colleges in and around Chennai were selected for the conduct of an online course for the purpose of the study. The Institutions were carefully selected based on the performance of their students and sufficient care has been taken to have variety and uniformity in the sample.

The sample size of the study was calculated using the guideline given by Krejcie and Morgan (1970). Accordingly it was decided to include 600 students from the 10 institutions chosen as 60 students were selected from each of the ten institutions. Thus the final sample size was 600 students from Second year and third year course of Bachelor of Engineering (B.E.) in Computer Science Engineering (CSE) department.

DATA COLLECTION

A pretest was conducted by the researcher to the participants in their college. They were given an introduction about working with Moodle. The researcher took the responsibility of registering the students and faculty from an institution into the course. The contacts throughout the course and tests at the end are conducted fully through online; the questionnaires are also distributed through online at the time of course completion.

IV. RESULTS & DISCUSSION

IV.1 RELIABILITY ANALYSIS

Table 1 shows the Cronbach's alpha scores of all the variables of the study. The results indicate the values of the alpha as well above the cut-off limit of 0.7. Hence, the inference is that the instrument designed for the study is reliable and can be conveniently administered with the samples of the study.

Table 1: Reliability Analysis

Variable	No. of Items	Cronbach's Alpha
Attention and Motivation	9	0.78
Confidence for Communication	11	0.86
Self-learning Capability	7	0.72

IV.2 HYPOTHESIS TESTING

The hypotheses were tested using the statistical testing technique One-Way ANOVA.

1a. There is no significant difference in the mean value for the variable "Attention and Motivation in the video lectures" among respondents with different level of performance in terms of their academic grade.

The statistical test one way ANOVA (Analysis of Variance) was used to measure the significance of the difference in the mean value of the responses for the variable Attention and Motivation among students with different level of performance in terms of their academic grade. The academic grade of the students was categorized into five groups as Above 90 marks, 81 to 90 marks, 71 to 80 marks, 50 to 70 marks, and Less than 50 marks.

The descriptive statistics of the variable Attention and Motivation showing the distribution of responses in terms of the mean and the standard deviation for different academic grade of the respondents of the study is shown in Table 2.



Table 2: Descriptive Statistics: Attention and Motivation

Variable	Grade (Marks)	N	Mean	Std. Deviation	Minimum	Maximum
Attention and Motivation	Above 90	81	4.181	0.2608	3.8	4.8
	81 to 90	116	4.243	0.2645	3.9	5.0
	71 to 80	135	4.290	0.2229	3.7	4.9
	50 to 70	66	4.252	0.2355	3.7	4.8
	Less than 50	2	4.200	0.1414	4.1	4.3
	Total	400	4.248	0.2472	3.7	5.0

The results of ANOVA shown in Table 3 indicate a significant difference in the mean value for the variable Attention and Motivation [$F(1, 398) = 2.530, p = 0.04$] reported across the different academic grade of the respondents. The p-value is less than 0.05; hence the null hypothesis is rejected.

Table 3: ANOVA: Academic Grade on Attention and Motivation

Variable		Sum of Squares	df	Mean Square	F	Sig.
Attention and Motivation	Between Groups	.609	4	.152	2.530	0.04
	Within Groups	23.769	395	.060		
	Total	24.378	399			

1b. There is no significant difference in the mean value for the variable “Confidence for Communication” among respondents with different level of performance in terms of their academic grade.

One way ANOVA (Analysis of Variance) was used for the measurement of the significance of the difference in the mean value for the responses of the variable Confidence for Communication among students with different levels of performance in terms of their academic grade which was categorized into five groups as Above 90 marks, 81 to 90 marks, 71 to 80 marks, 50 to 70 marks, and Less than 50 marks.

The descriptive statistics of the variable Confidence for Communication showing the distribution of responses in terms of mean and standard deviation for different academic grade of the respondents of the study are shown in Table 4.



Table 4: Descriptive Statistics: Confidence for Communication

Variable	Grade (Marks)	N	Mean	Std. Deviation	Minimum	Maximum
Confidence for Communication	Above 90	81	4.468	0.1116	4.2	4.8
	81 to 90	116	4.447	0.1834	3.7	5.0
	71 to 80	135	4.489	0.1923	4.0	5.0
	50 to 70	66	4.436	0.2435	3.6	4.8
	Less than 50	2	3.900	0.4243	3.6	4.2
	Total	400	4.461	0.1916	3.6	.0

The results of ANOVA shown in Table5 indicate a significant difference in the meanvalue for the variable Confidence for Communication [$F(1, 398) = 5.702, p = 0.000 < .05$] reported across the different academic grade of the respondents. The p-value is less than 0.05, hence the null hypothesis is rejected.

Table 5: ANOVA: Academic Grade on Confidence for Communication

Variable		Sum of Squares	df	Mean Square	F	Sig.
Confidence for Communication	Between Groups	.800	4	0.200	5.702	0.000
	Within Groups	13.852	395	0.035		
	Total	14.652	399			

1c. There is no significant difference in the mean value for the variable “Self-learning Capability” among respondents with different level of performance in terms of their academic grade.

One way ANOVA (Analysis of Variance) was used for the measurement of the significance of the difference in the mean value for the responses of the variable Self-learning Capabilityamong students with different level of performance in terms of their academic grade. The academic grade of the students was categorized into five groups as Above 90 marks, 81 to 90 marks, 71 to 80 marks, 50 to 70 marks, and Less than 50 marks.

The descriptive statistics of the variable Self-learning Capability showing the distribution of responses in terms of mean and standard deviation for different academic grade of the respondents of the study is shown in Table 6.



Table 6: Descriptive Statistics: Self-learning Capability

Variable	Grade (Marks)	N	Mean	Std. Deviation	Minimum	Maximum
Self-learning Capability	Above 90	81	4.522	0.1405	4.1	4.7
	81 to 90	16	4.428	0.1946	3.9	4.7
	71 to 80	135	4.190	0.2106	3.7	4.6
	50 to 70	66	4.042	0.2046	3.4	4.4
	Less than 50	2	3.900	0.2828	3.7	4.1
	Total	00	4.301	0.2598	3.4	4.7

The results of ANOVA as shown in Table 7 indicates significant difference in the mean value for the variable Self-learning Capability [$F(1, 398) = 82.065, p = 0.000 < .05$] has been reported across the different academic grade of the respondents. The p-value is less than 0.05, hence the null hypothesis is rejected.

Table 7: ANOVA: Academic Grade on Self-learning Capability

Variable		Sum of Squares	df	Mean Square	F	Sig.
Self-learning Capability	Between Groups	12.257	4	3.064	82.065	0.000
	Within Groups	14.683	395	0.037		
	Total	26.940	399			

The results lead to the conclusion that students with different academic grade exhibit different patterns in their attitude towards video lectures based on LMS Moodle.

V. CONCLUSION

The study compared how students with different level of performance based on their academic grades (categorized as Above 90 marks, 81 to 90 marks, 71 to 80 marks, 50 to 70 marks and Less than 50 marks) responded to the variables measuring their experience with Video lectures based Moodle LMS on “OOM”. The experience of students in LMS was measured using there variables namely Attention and Motivation, Confidence for Communication and Self-learning Capability. In addition, a set of hypotheses tested how students from different year of study differed in their responses to the variables measuring their experience with Video lectures based Moodle LMS on “OOM”. The testing of hypothesis leads to draw following conclusions:

- “There is no significant difference in the mean value for the variable “Attention and Motivation in the video lectures” between respondents with different level of performance in terms of their academic grade” was rejected.
- There is no significant difference in the mean value for the variable “Confidence for Communication” among

respondents with different level of performance in terms of their academic grade” was rejected.

- There is no significant difference in the mean value for the variable “Self-learning Capability” among respondents with different level of performance in terms of their academic grade” was rejected.

IV.1 BENEFITS

Descriptive Statistics given demonstrate that the gain of non-cognitive skills mentioned in the objectives has been achieved. The Hypotheses stated and verified confirm the gain of the non- cognitive skills mentioned in the objectives; The student responses through the self-assessment are established and reinforced by their performance in the various formative evaluation activities of the Moodle course.

The growth and development in the Elearning tools and technologies pose significant challenge and opportunities to the educators in designing the learning experiences to millennial students. The results of the data analysis has evidenced the improvement in non-cognitive skills of learning. It has been proved in the research that the students show a positive attitude toward the course on LMS Moodle environment.

IV.2 LIMITATIONS

Some of the limitations of the current research work are listed below:

- The course was administered only for a short period, a week covering a part of the subject Object Oriented Programming Systems(OOPS).
- Only few activities like “Quiz”, “Assignment”, “Forum” was included in Moodle LMS framework in this research.
- Only three non-cognitive skills was considered in this research.

IV.3 FUTURE WORK

- Longitudinal research can be carried out, in the sense, course can be administered for a longer duration;
- More relevant non-cognitive skills can be assessed.
- Same and more skills suited to different areas can be analyzed.
- Non-cognitive skills noted from Graduate Attributes as expected by Employers can be considered, and corrective measures can be taken which may result in the development of the students in ‘career-based’ areas along with cognitive outcomes.

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