

# MOODLE: An Innovative Teaching-Learning Strategy Among SISC College Students in Science, Psychology, and Nursing Subjects

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by Marie Avegail M. Dolleton

## INTRODUCTION

Considerable research has been devoted to the question of what constitutes good teaching. While some research has involved asking faculty about good teaching practices, most studies have surveyed students to ask their opinions. Although the majority of students in a class may agree on the qualities of a good teacher, some students have different opinions based on their individual learning styles, goals and personal needs.

In 2008, Gnu's Not Unix (GNU), a Unix-compatible software, published that pedagogy as an art or science of being a teacher, generally refers to strategies of instruction, or a style of instruction. The word comes from the Ancient Greek παιδαγωγέω (paidagōgeō; from παῖς (child) and ἄγω (lead)): literally, "to lead the child". Traditional teaching involves lecture and discussion. However, these teaching strategies are considered teacher centered. Nowadays, pedagogy evolved into activity-based or student-centered teaching strategy. In this way, learners are required to do more than just listening and studying. They are now engaged in creating and storing knowledge for themselves. In a true collaborative environment, both the students and the teacher are learners. By understanding the context of

others, the educators can teach in a more transformational way. A learning environment needs to be flexible and adaptable to quickly respond to the needs of the participants within it. This principle is enveloped in the philosophy of constructivism.

Rice (2006) asserts that learning is particularly effective when constructing something for others to experience. This can be anything from a spoken sentence or an internet posting, to more complex artifacts like a painting, a house or a software package. From a constructivist point of view, people actively construct new knowledge as they interact with their environments. Everything perceived is tested against one's prior knowledge and if viable within the mental world, this may form new knowledge that is strengthened if used successfully in wider environment. This does not mean that one cannot learn anything from just reading a web page or watching a lecture. The point is that there is more interpretation going on than a transfer of information from one brain to another.

With the advent of modern technology, computers are used to communicate information to students in a time-saving way, to teach critical thinking and problem solving, to provide simulation to reality and to educate from a distance. De Young (2003) stated numerous advantages of Computer Technology in the learning process. Computers can support mastery learning very well. Learners may

### *MOODLE: An Innovative Teaching-Learning Strategy*

spend as much time as they want or are allowed in learning concepts and skills, until they have achieved mastery. In addition, computers can maximize time on task and can help develop overlearning which is achieved when learners practice beyond the point of mastery and responses become automatic. In a traditional classroom, the smartest students usually learn quickly and have more time to devote to overlearning. Less bright students usually take the most time to learn concepts and skills and have little time left for overlearning. Thus, they are not as prepared to move on to higher levels of learning. With computer instruction, if learners are motivated intrinsically or by attractive programming, they may continue to practice even at home until they have overlearned the material. De Young (2003) also mentioned other advantages of computer instruction such as interactivity, instructional consistency, reduction of teachers' repetitive tasks, individualized instruction, time efficiency and cost effectiveness.

The drawbacks to computer instruction must be considered. Most educators do not feel comfortable because they do not have good computer skills and they do not know how to incorporate computers into their teaching role. A second drawback is the availability of sophisticated facilities. Some students do not own or have ready access to computers at home. Older students do not have the computer literacy skills they need to master a web-based course. This strategy should be supported by sufficient orientation to the computer program and advanced computer system in order to ensure success in students' learning. The institution should be equipped with a good computer information technology and should provide adequate facilities, which would cater to the needs of all the students and the faculty as well.

Developing a web-based course is not an easy task. In most cases, the development requires the combined efforts of the instructor or content expert and an instructional designer or educational technologist. Online learning encourages the participants to become active learners. They are not sitting and listening to a lecture but

must find information via technology and afterwards, discuss what they have learned. On the other hand, there are also some drawbacks to online learning. This is not an adequate substitute for the full and rich experience of the classroom. Perhaps, this can be used as an alternative or supplementary teaching strategy. According to De Young (2003), visual cues are absent and meaning in written discussion may be slightly distorted without the body language that goes with it. Although clarification and feedback can be given, they are usually not immediate.

In line with computer teaching and distance learning, the Course Management System (CMS) or Virtual Learning Experience (VLE) is created. This is a free, Open Source software package designed using sound pedagogical principles, to help educators create effective online learning communities. This can be downloaded and used on any computer yet it can scale from a single-teacher site to a University with 200,000 students. The site is created using Moodle.

William Rice (2006) is the developer of Moodle Online Learning. According to him, Moodle has a large and diverse user community with over half a million registered users on this site alone, speaking over 75 languages in 193 countries (we have more statistics here). This enables the teacher to create powerful, flexible, and engaging online learning experiences. Moodle's name gives insight into its approach to e-learning. From the official Moodle documentation: The word Moodle was originally an acronym for Modular Object-Oriented Dynamic Learning Environment, which is mostly useful to programmers and education theorists in creating an active learning environment, full of different kinds of student-to-student and student-to-teacher interaction. This is the kind of user experience that Moodle excels at.

Southville International School and Colleges launched Moodle Online Learning with the following rationale: (1) Using the Moodle concretizes quality

education as the courseware is a well thought set of teaching and assessment; (2) This is an evidence of being globally aligned with trends in 21<sup>st</sup> century education.

## **THEORETICAL FRAMEWORK**

The design and development of Moodle is guided by "social constructionist pedagogy". Rice (2006) stressed that social constructivism allows groups to construct knowledge for one another, collaboratively creating a small culture of shared artifacts with shared meanings. When one is immersed within a culture like this, one is learning all the time about how to be a part of that culture, on many levels.

This idea looks deeper into the motivations of individuals within a discussion:

- (a) Separate behavior is when someone tries to remain 'objective' and 'factual', and tends to defend their own ideas using logic to find holes in their opponent's ideas.
- (b) Connected behavior is a more empathic approach that accepts subjectivity, trying to listen and ask questions in an effort to understand the other point of view.
- (c) Constructed behavior is when a person is sensitive to both of these approaches and is able to choose either of them as appropriate to the current situation.

In general, a healthy amount of connected behavior within a learning community is a very powerful stimulant for learning, not only bringing people closer together; but promoting deeper reflection and re-examination of their existing beliefs. Consideration of these issues can help to focus on the experiences that would be best for learning from the student's point of view, rather than just publishing and assessing the information they need to know. This can also help realize how each participant in a course can be a teacher as well as a learner. The educator's job can change from being 'the source of knowledge' to being an influencer and role

model of class culture, connecting with students in a personal way that addresses their own learning needs, and moderating discussions and activities in a way that collectively leads students towards the learning goals of the class.

Moodle does not force this style of behavior, but this is what the designers believe that it is best at supporting. In future, as the technical infrastructure of Moodle stabilizes, further improvements in pedagogical support will be a major direction for Moodle development.

Rice (2006) designed the Moodle using a metacourse that automatically enrolls participants from other courses. Meta courses inherit their enrollments from these other courses instead of having students added manually. This feature can populate many meta courses from one course with normal enrollments or one meta course from many courses with normal enrollments. For example (Scenario 2, below), a normal course can be used as the central enrolment point for a programme of study composed of several meta courses. Each time a student enrolls in (or unenrolls from) this course, they are automatically enrolled/unenrolled from any meta course(s) associated with it, which would contain the programme's teaching activities. Meta course enrolments do not preserve groups and enrolment does not happen immediately, but occurs next time the work runs. In Moodle 1.5 and 1.6, if a meta course is chosen, the students page changes from listing/searching for students to listing/searching for courses. In Moodle 1.7 onwards, "Child courses" appears in the teacher's administration block. It is not possible to add individual students to a meta course, as meta course enrolment is controlled by child course enrolment only. Meta courses may be used in a variety of ways:

*MOODLE: An Innovative Teaching-Learning Strategy*

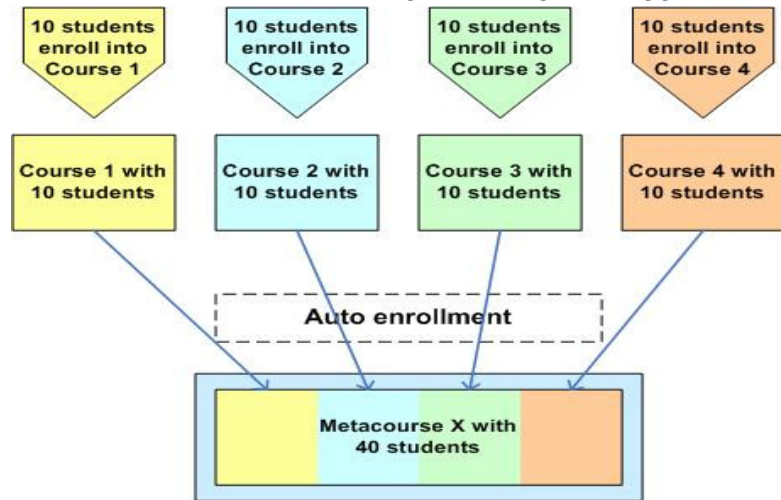


Figure 1. X is a meta course with Course 1 through 4 as normal courses with standard student enrollments. Students enrolling on these courses are automatically enrolled onto Meta course X.

For example, a General Education teacher or department has 2 science and 2 psychology courses. The teacher or department wants course for each of these subjects. But they also want a generic space where they can post things for all of the students in all of their courses, perhaps including compulsory work for all students. By making science 1 & 2 and psychology 1 & 2 as each as part of a General Education Meta course, they achieve this goal.

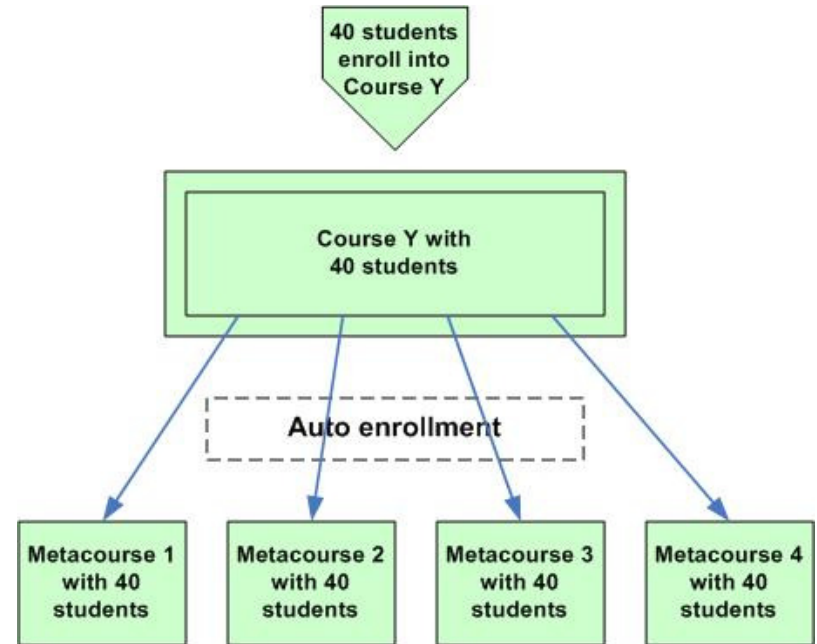
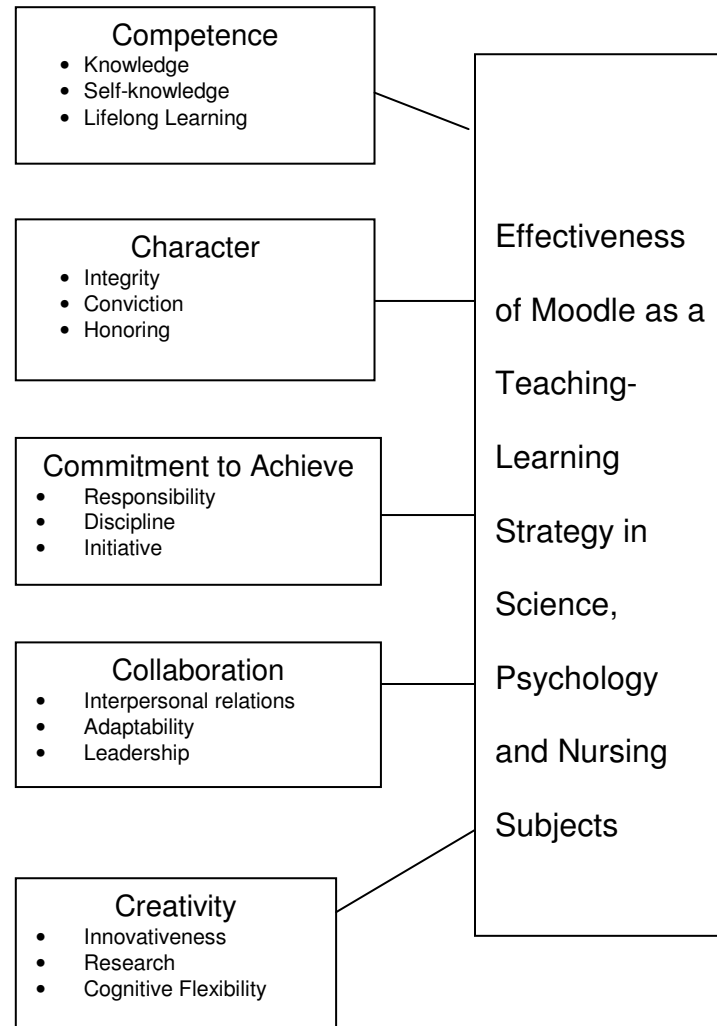


Figure 2. Meta courses 1-4 are linked to Y which is a normal course. Students enrolling on Course Y are automatically enrolled on Meta courses 1-4. This would be used, for example, when all five courses are intended to have exactly the same students.

In both diagrams, students are being enrolled normally into standard courses and then the entire student list of a course being added to the Meta course.

## CONCEPTUAL FRAMEWORK



**Figure 3.** Conceptual Paradigm. Based on SISC's 5Cs (2008), the perceptions of college students in Science, Psychology and Nursing subjects were assessed in order to find out the effectiveness of MOODLE as a teaching-learning strategy.

## STATEMENT OF THE PROBLEM

This study assessed the effectiveness MOODLE as a teaching-learning strategy in Science, Psychology and Nursing subjects through the views of the college students in SISC for the Second Semester, Academic year 2008-2009.

Specifically, the research answered the following questions:

1. What are the perceptions of college students on the effectiveness of MOODLE as a teaching-learning strategy in Science, Psychology and Nursing subjects based on the following dimensions?
  - 1.1. Competence
  - 1.2. Character
  - 1.3. Commitment to achieve
  - 1.4. Collaboration
  - 1.5. Creativity
2. What are the areas of strengths of MOODLE as a teaching-learning strategy as perceived by the college students in Science, Psychology and Nursing subjects based on the following dimensions?
  - 2.1. Competence
  - 2.2. Character
  - 2.3. Commitment to achieve
  - 2.4. Collaboration
  - 2.5. Creativity
3. What are the areas of improvement of MOODLE as a teaching-learning strategy as perceived by the college students in Science, Psychology and Nursing subjects based on the following dimensions?
  - 3.1. Competence
  - 3.2. Character
  - 3.3. Commitment to achieve
  - 3.4. Collaboration
  - 3.5. Creativity
4. Is there a significant difference on the perceptions of college students on the effectiveness of MOODLE as a teaching-learning strategy in Science, Psychology and Nursing subjects based on the following dimensions?

## *MOODLE: An Innovative Teaching-Learning Strategy*

- 4.1. Competence
- 4.2. Character
- 4.3. Commitment to achieve
- 4.4. Collaboration
- 4.5. Creativity

### Assumptions of the Study

The study assumed the following:

1. All the respondents were taught about the process of using the MOODLE in Science, Psychology and Nursing subjects.
2. The respondents answered the questionnaire truthfully and to the best of their ability

### Scope and Limitation

The study focused on the effectiveness MOODLE as a teaching-learning strategy in Science, Psychology and Nursing subjects.

The respondents were composed of three groups of college students: 13 for Biology subject (Science), 12 for Psychology of Personal Growth and Adjustment (Psychology), and 98 for Nutrition and Diet Therapy (Nursing). The respondents were chosen because they are able to utilize MOODLE from week 1 to 18. They were trained on the process of downloading the handouts, checking of posted reminders or announcements and uploading of individual and group assignments and research works. Forums, blogs, global search and online examination were not introduced to the respondents.

The questionnaire was given to all respondents who are present during the administration of instrument which took place in their respective classrooms during final examination. The students who were not present during that time were excluded in the study. For Biology with HIV, there were only 13 respondents. Out of the 16 students who are enrolled in this class, there were 2 students who went abroad

ahead of time due to their practicum and 1 student who did not report to class anymore due to health reason. For PPGA, there were only 12 respondents. Out of 16 students who are enrolled in this class, there were 3 graduating students who took the advance exam and 1 student who did not report to class anymore due to health reason. For Nursing, there were 98 respondents. Out of the 104 students who are enrolled in this class, there were 4 of them who were not present when the questionnaire was not administered.

### Definition of Terms

The following terms have been operationally defined to enable the readers to have a common frame of reference:

**MOODLE.** This is an acronym that stands for Modular Object-Oriented Dynamic Learning Environment. This refers to the online learning teaching strategy being introduced to Southville.

**Competence.** In the context of the 5Cs in SISC, competence deals with knowledge, self-knowledge and love for learning or lifelong learning.

**Character.** In the context of the 5Cs in SISC, this deals with integrity, conviction, congruence, ethics and honoring.

**Commitment to Achieve.** In the context of the 5Cs in SISC, this deals with responsibility, discipline, results orientation and initiative.

**Collaboration.** In the context of the 5Cs in SISC, this deals with interpersonal relations, adaptability and leadership.

**Creativity.** In the context of the 5Cs in SISC, this deals with innovativeness, research, cognitive flexibility.

**Knowledge.** In the context of competence, this deals with promoting gathering of information about the topics in class based on the uploaded handouts.

**Self-Knowledge.** In the context of competence, this deals with creating a vision of the future through careful planning of how to gather information based on the posted course outline.

**Lifelong learning.** In the context of competence, this deals with manifests enduring passion for learning by using technology, communication and other tools for ongoing growth and development.

**Integrity.** In the context of character, this deals with encouraging intellectual honesty.

**Conviction.** In the context of character, this deals with upholding one's accountability for one's own behavior.

**Honoring.** In the context of character, this deals with enhancing accessibility of the lessons/topics in class.

**Responsibility.** In the context of commitment to achieve, this deals with facilitating lecture-discussion via downloading of handouts and reading materials in advance.

**Discipline.** In the context of commitment to achieve, this deals with developing reliability by uploading accomplished assignments on time or earlier even if these require longer hours of work.

**Initiative.** In the context of commitment to achieve, this deals with promoting initiative by logging in and checking the latest updates regularly.

**Interpersonal relations.** In the context of collaboration, this deals with making efforts in order to unite members of the group or get to know more classmates and instructors.

**Adaptability.** In the context of collaboration, this deals with doing one's part/responsibilities when doing group work

**Leadership.** In the context of collaboration, this deals with encourages leadership by informing classmates of lessons/assignments when they are absent.

**Innovativeness.** In the context of creativity, this deals with supporting creative strategies in order to solve problems or improve presentation of information such as graphic organizer or concept maps, tables, graphs, or drawings.

**Research.** In the context of creativity, this deals with engaging in a systematic investigation of truth for the purpose of creating new awareness, new insights and new knowledge for further enrichment or enhancement of the assignments/researches/projects.

**Cognitive flexibility.** In the context of creativity, this deals with visualizing creative ideas, be resourceful by knowing where to gather or obtain information or materials to get something done or putting together past and present or current data in order to suit current situations.

## **REVIEW OF RELATED LITERATURE**

### **Conceptual Literature**

Learning is a lifelong process. According to American Psychological Association (2005), the learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience. There are different types of learning processes, for example, habit formation in motor learning; and learning that involves the generation of knowledge, or cognitive skills and learning strategies. Learning in schools emphasizes the use of intentional processes that students can use to construct meaning from information, experiences, and their own thoughts and beliefs. Successful learners are active, goal-directed, self-regulating, and assume personal responsibility

## *MOODLE: An Innovative Teaching-Learning Strategy*

for contributing to their own learning. The principles set forth in this document focus on this type of learning.

There are three main categories or philosophical frameworks under which learning theories fall namely: [behaviorism](#), [cognitivism](#), and [constructivism](#). Behaviorism focuses only on the objectively observable aspects of learning. Cognitive theories look beyond behavior to explain brain-based learning. Constructivism views learning as a process in which the learner actively constructs or builds new ideas or concepts.

For behaviorism, learning is the acquisition of new behavior through conditioning. As a theory, behaviorism was most developed by Pavlov, Skinner, Thorndike, Watson, Tolman, and Bandura. According to these behaviorists, learning is first manifested by a change in behavior. Secondly, the environment shapes behavior. Finally, the principles of contiguity or closeness of two events for a bond to be formed, and reinforcement or any means of increasing the likelihood that an event will be repeated are central to explaining the learning process (Feldman, 2003).

The earliest challenge to the behaviorists came in a publication in 1929 by Bode, a Gestalt psychologist. He criticized behaviorists for being too dependent on overt behavior to explain learning. Gestalt psychologists proposed looking at the patterns rather than isolated events. Gestalt views of learning have been incorporated into cognitive theories. Two key assumptions underlie this cognitive approach: (1) that the memory system is an active organized processor of information and (2) that prior knowledge plays an important role in learning. Cognitive theories look beyond behavior to explain brain-based learning. Cognitivism theories consider how human memory works to promote learning. The major difference between Gestaltists and behaviorists is the locus of control over the learning activity. For Gestaltists, the control lies with the individual learner; for behaviorists, the control lies with the environment (Acero, 2004). Nowadays, researchers are concentrating on topics

like [Cognitive load](#) and [Information Processing](#) Theory. These theories of learning are very useful as they guide the [Instructional design](#).

On the other hand, learning also involves constructing one's own knowledge from one's own experiences. Constructivist learning, therefore, is a very personal endeavor, whereby internalized concepts, rules, and general principles may consequently be applied in a practical real-world context. This is also known as social constructivism. According to GNU Public License (2008), social constructivists posit that knowledge is constructed when individuals engage socially in talk and activity about shared problems or tasks. Constructivism promotes a student's free exploration within a given framework or structure. The teacher acts as a facilitator who encourages students to discover principles for themselves and to construct knowledge by working to solve realistic problems.

Other learning theories have also been developed. These learning theories may have a more specific purpose than general learning theories. For example, [Multimedia learning](#) theory focuses on principles for the effective use of multimedia in learning or instructional technology.

In 2008, the Association for Educational Communications and Technology (AECT) Definitions and Terminology Committee defined instructional technology as the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning. Instructional technology is often referred to as a part of educational technology. While instructional technology covers the processes and systems of learning and instruction, [educational technology](#) includes other systems used in the process of developing human capability.

Many histories of instructional technology started in the early 1900s, while others go back to the 1600s. The use of audio and visual instruction was boosted as a military response to the problems of a labor shortage during [WWII](#) in

### *MOODLE: An Innovative Teaching-Learning Strategy*

the [United States](#). There was a definitive need to fill the factories with skilled labor. Instructional technology provided a methodology for training in a systematic and efficient manner. From that event, there was an emergence of highly structured manuals, instructional films, and [standardized tests](#) (Richey, 2008).

As early as 1993, Graziadei, W. D. described an online computer-delivered lecture, tutorial and assessment project using electronic Mail, two VAX Notes conferences and Gopher/Lynx together with several software programs that allowed students and instructor to create a Virtual Instructional Classroom Environment in Science (VICES) in Research, Education, Service & Teaching (REST). In 1997 Graziadei, W.D., et al., published an article entitled "Building Asynchronous and Synchronous Teaching-Learning Environments: Exploring a Course/Classroom Management System Solution". They described a process at the [State University of New York \(SUNY\)](#) of evaluating products and developing an overall strategy for technology-based course development and management in teaching-learning. The product(s) had to be easy to use and maintain, portable, replicable, scalable, and immediately affordable, and they had to have a high probability of success with long-term cost-effectiveness. Today many technologies can be, and are, used in e-Learning, from [blogs](#) to [collaborative software](#), [ePortfolios](#), and [virtual classrooms](#). Most eLearning situations adapted a combination of these techniques.

Instructional technology is a growing field of study which uses technology as a means to solve educational challenges, both in the classroom and in distance learning environments. While instructional technology promises solutions to many educational problems, resistance from faculty and administrators to the use of technology in the classroom is not unusual. This reaction can arise from the belief that the ultimate aim of instructional technology is to reduce or even remove the human element of instruction. However, most instructional technologists would counter that

education will always require human intervention from instructors or facilitators.

According to Garrison and Anderson (2003), the terms learning technology, instructional technology, and educational [technology](#) generally refer to the use of technology in learning in a much broader sense than the [computer-based training](#) or *Computer Aided Instruction* of the 1980s. Meanwhile, these terms are also broader than the terms *Online Learning* or *Online Education* which generally refer to purely web-based learning. In cases where mobile technologies are used, the term [M-learning](#) has become more common. E-learning, however, also has implications beyond just the technology and refers to the actual learning that takes place using these systems.

Razavi (2005) advocates that educational technology covers both instructional technology and the field study in human teaching and learning. Instructional technology itself is consisted from two major parts. One is teaching technology and another is learning technology. In the education industry, the term "instructional technology" is frequently used interchangeably with "educational technology."

There are numerous terms associated with Educational technology. Among these terms are the following: (1) Computer Based Learning, sometimes abbreviated to CBL, which refers to a structured environment in which computers are used for teaching purposes; (2) Computer-based training (CBT) services, which is where a student learns by executing special training programs on a [computer](#) relating to their occupation; (3) Web-based training (WBT), which is a type of training that is delivered over the [Internet](#) using a [web browser](#). Web-based training frequently includes interactive methods, such as [bulletin boards](#), [chat rooms](#), [instant messaging](#), [videoconferencing](#), and discussion threads; and (4) [Computer-supported collaborative learning \(CSCL\)](#), which is one of the most promising innovations to improve teaching and learning with the help of modern information and communication technology. Collaborative or group

### *MOODLE: An Innovative Teaching-Learning Strategy*

learning refers to instructional methods whereby students are encouraged or required to work together on learning tasks. It is widely agreed to distinguish collaborative learning from the traditional 'direct transfer' model in which the instructor is assumed to be the distributor of knowledge and skills (<http://www.kdsi.org>).

Brown and Adler (2008) categorized communication technologies as asynchronous or synchronous. Asynchronous activities use technologies such as [blogs](#), [wikis](#), and [discussion boards](#). The participants may engage in the exchange of ideas or information without the dependency of other participants' involvement at the same time. Electronic mail (Email) is also [asynchronous](#) in that mail can be sent or received without having both the participants' involvement at the same time. On the other hand, synchronous activities involve the exchange of ideas and information with one or more participants during the same period of time. A face to face discussion is an example of synchronous communications. Synchronous activities occur with all participants joining in at once, as with an online chat session or a virtual classroom or meeting. Virtual classrooms and meetings can often use a mix of communication technologies. The most recent development in synchronous communications is the e-Learning [2.0](#) which refers to new ways of thinking about e-learning inspired by the emergence of [Web 2.0](#). From an e-Learning 2.0 perspective, conventional e-learning systems were based on instructional packets that were delivered to students using Internet technologies. The role of the student consisted in learning from the readings and preparing assignments. Assignments were evaluated by the teacher. In contrast, the new e-learning places increased emphasis on [social learning](#) and use of [social software](#) such as blogs, wikis, podcasts and virtual worlds such as [Second Life](#). This phenomenon has also been referred to as Long Tail Learning.

Furthermore, Communication technologies through educational or instructional technology can facilitate flexible learning which is a set of educational philosophies and

systems, concerned with providing learners with increased choice, convenience, and personalization to suit the learner. In particular, flexible learning provides learners with choices about where, when, and how learning occurs. Flexible learning is a term often used in [New Zealand](#) and [Australia](#). Flexible learning approaches are often designed using a full range of teaching and learning theories, philosophies and methods to provide students with opportunities to access information and expertise, contribute ideas and opinions, and correspond with other learners and mentors. This may occur through the use of internet-based tools such as [Virtual Learning Environments](#) (VLEs) or [Learning Management Systems](#) (LMSes), discussion boards or chat rooms; and may be designed as a "blended" approach, with content available electronically and remotely, as well as "face-to-face" classroom tutorials and lectures. While the majority of flexible learning programs to date have taken advantage of computer-based systems or "eLearning", the rapidly increase in the processing power and popularity of mobile digital devices has recently caused considerable interest in [mobile learning](#) or the use of mobile devices such as mobile phones, iPods, and Personal Digital Assistants (PDAs) to increase the mobility of learners and correspondingly enhance the flexibility of their learning (Shurville et. al. ,2008).

### **Research Literature**

In order to match contemporary demands for competencies including basic knowledge and understanding, professional skills as well as personal qualities such as flexibility, creativity, independence, responsibility, service orientation etc. there is a need for a new concept of learning covering the development and acquisition of all such competencies (Illeris, 2001).

Stolovich (2006) mentioned that many [graduate programs](#) are producing instructional designers, who increasingly are being employed by industry and universities to create materials for [distance education](#) programs. These professionals often employ [e-learning](#) tools, which provide

### *MOODLE: An Innovative Teaching-Learning Strategy*

distance learners the opportunity to interact with instructors and experts in the field, even if they are not located physically close to each other. More recently a new form of Instructional technology known as [Human Performance Technology](#) has evolved. HPT focuses on performance problems and deals primarily with corporate entities.

The most common tool in educational technology is e-learning. Garrison and Anderson (2003) described Electronic learning or e-Learning or eLearning as a type of Technology supported education/learning (TSL) where the medium of instruction is through computer technology, particularly involving digital technologies. Nichols (2008) defined E-learning as [pedagogy](#) empowered by digital technology. In some instances, no face-to-face interaction takes place. In the [United States](#), this is defined as a planned teaching/learning experience that uses a wide spectrum of technologies, mainly Internet or computer-based, to reach learners. E-learning is naturally suited to [distance learning](#) and flexible learning, but can also be used in conjunction with face-to-face teaching, in which case the term [Blended learning](#) is commonly used. In [higher education](#) especially, the increasing tendency is to create a [Virtual Learning Environment](#) (VLE), which is sometimes combined with a [Management Information System \(MIS\)](#) to create a [Managed Learning Environment](#), in which all aspects of a course are handled through a consistent user interface standard throughout the institution. A growing number of physical universities, as well as newer online-only colleges, have begun to offer a select set of [academic degree](#) and certificate programs via the Internet at a wide range of levels and in a wide range of disciplines. While some programs require students to attend some [campus](#) classes or orientations, many are delivered completely online. In addition, several universities offer online student support services, such as online advising and registration, e-counseling, online textbook purchase, student governments and student newspapers. At the same time, e-Learning refers to

educational web sites such as those offering learning scenarios, worksheets and interactive exercises for children.

Lately in most universities, e-learning is used to define a specific mode to attend a course or programmes of study where the students rarely, if ever, attend face-to-face for on-campus access to educational facilities, because they study online. The worldwide e-learning industry is estimated to be worth over thirty-eight (38) billion euros according to conservative estimates; although in the [European Union](#) only about 20% of e-learning products are produced within the common market (EC, 2000). Developments in internet and multimedia technologies are the basic enabler of e-learning, with content, technologies and services being identified as the three key sectors of the e-learning industry. Nagy (2005) stated that eLearning is a catch-all term that covers a wide range of instructional material that can be delivered on a [CD-ROM](#) or [DVD](#), over a [local area network \(LAN\)](#), or on the Internet. By 2006, nearly 3.5 million students were participating in on-line learning at institutions of higher education in the [United States](#).

Many higher education, [for-profit](#) institutions, now offer on-line classes. By contrast, only about half of private, [non-profit](#) schools offer them. The Sloan report, based on a poll of academic leaders, says that students generally appear to be at least as satisfied with their on-line classes as they are with traditional ones. Private institutions may become more involved with on-line presentations as the cost of instituting such a system decreases. Properly trained staff must also be hired to work with students on-line. These staff members need to understand the content area, and also be highly trained in the use of the computer and Internet. Online education is rapidly increasing, and online [doctoral programs](#) have even developed at leading research universities (Herbert, 2007).

Furthermore, Brown and Adler (2008) introduced the term *learning design* which refers to the type of activity enabled by software such as the [open-source](#) system such as

### *MOODLE: An Innovative Teaching-Learning Strategy*

LAMS and MOODLE, which support sequences of activities that can be both adaptive and collaborative. The [IMS Learning Design](#) specification is intended as a standard format for learning designs, and IMS LD Level A is supported in MOODLE and LAMS V2. eLearning has been replacing the traditional settings due to its cost effectiveness.

In addition, eLearning can provide for major benefits for the organizations and individuals involved. Firstly, eLearning can reduce environmental impact by allows people to avoid travel, thus reducing the overall carbon output. The fact that this takes place in a virtual environment also allows some reduction of paper usage. With virtual notes instead of paper notes and online assessments instead of paper assessments, eLearning is a more environmentally friendly solution. Secondly, quality education is made affordable. The fact that instructors of the highest caliber can share their knowledge across borders allows students to attend courses across physical, political, and economic boundaries. Recognized experts have the opportunity of making information available internationally, to anyone interested at minimum costs. This can drastically reduce the costs of higher education, making it much more affordable and accessible to the masses. An internet connection, a computer, and a projector would allow an entire classroom in a third world university to benefit from the knowledge of an opinion leader. Finally, eLearning promotes convenience and flexibility to learners. In many contexts, eLearning is self-paced and the learning sessions are available for 24 hours. Learners are not bound to a specific day or time to physically attend classes. They can also pause learning sessions at their convenience.

However, there are pedagogical elements that should be addressed to define structures or units of educational material in terms of eLearning. For example, this could be a lesson, an assignment, a multiple choice question, a quiz, a discussion group or a case study. When beginning to create e-Learning content, the pedagogical approaches need to be evaluated. Simple pedagogical approaches make it easy to

create content, but lack flexibility, richness and downstream functionality. On the other hand, complex pedagogical approaches can be difficult to set up and slow to develop, though they have the potential to provide more engaging learning experiences for students. Somewhere between these extremes is an ideal pedagogy that allows a particular educator to effectively create educational materials while simultaneously providing the most engaging educational experiences for students. According to Salmon and Page's Key to Teaching and Learning Online (2000), there are various pedagogical approaches for eLearning which include the following: (1) [Instructional design](#), which is a curriculum-focused traditional pedagogy of instruction developed by a centralized educating group or a single teacher; (2) [Social-constructivist](#), which is a pedagogy that is particularly well afforded by the use of discussion forums, blogs, wiki and on-line collaborative activities; (3) Cognitive perspective, which focuses on the cognitive processes involved in learning as well as how the brain works; (4) Emotional perspective focuses on the emotional aspects of learning, like motivation, engagement, fun, etc and (5) behavioral perspective focuses on the skills and behavioral outcomes of the learning process; (6) Contextual perspective focuses on the environmental and social aspects which can stimulate learning such interaction with other people, collaborative discovery and the importance of peer support as well as pressure and reusability, standards and learning objects.

In line with these pedagogical approaches for eLearning, this study utilized MOODLE as a tool for eLearning and the teaching-learning strategy is measured using SISC's 5Cs. The 5Cs program in Southville International School and Colleges (SISC) is an institutionalized program that summarizes the school's Vision and Mission as well as the Quality Policy and Objectives. These 5Cs are the Core Values that the school endows upon not only the students, but the faculty and staff as well. The 5Cs stands for Competence, Character, Commitment to Achieve, Collaboration and Creativity. These

*MOODLE: An Innovative Teaching-Learning Strategy*

are the Core Values that the school's Vision and Mission stand for. Competence gauges one's ability to do or perform. This is where the skills and knowledge of an individual are used to perform certain task. Character gauges an individual's ethics. It is where one's judgment affects what a person does at certain disposition. Commitment to Achieve determines one's desire to attain their goals. It is when the individual realizes the importance of achieving the set goals. Collaboration determines an individual's ability to work with others. Through collaboration, the individual is able to achieve certain goals the he or she cannot achieve alone. Creativity brings out a person's personality in the way he or she sets out to achieve their goals. This is where one individual differs from another, some set out to achieve similar goals, but have different ways of achieving set goals.

Lupisan (2008) implemented the integration of 5Cs in the curriculum and instruction in the College Division of SISC. He defined the subcomponents under each of the 5C component. Competence has three subcomponents namely: (1) Knowledge, which demonstrates an acceptable level of proficiency in English, Math and Computer and an acceptable level of knowledge and skills of the Core competencies of the respective college courses; (2) Self-knowledge, which deals with having an accurate perception of one's personal strengths, weaknesses, limitations and habits of the mind and how these either shape or impede one's growth, performance and output; (3) Love for Learning or Lifelong Learning, which manifests enduring passion for learning by using research, technology, communication, and other tools for ongoing growth and development.

Meanwhile, Character has five subcomponents namely: (1) Integrity, which refers to being consistent with one's words and actions, upholding one's word of honor, conducting oneself with professional and ethical dignity and demonstrating honesty, transparency and responsibility in dealing with people and institutions; (2) Conviction, which is taking action based on ethical principles, (3) Congruence, which expresses truthfulness, (4) Ethics, which adheres to

principles and standards in the practice of profession and (5) Honoring, which acknowledges people and institutions that have significantly influenced one's life and takes pride in the contributions of people and institutions in one's development.

On the other hand, Commitment to achieve has four subcomponents namely: (1) Responsibility, which refers to accepting and being accountable to one's duties and obligations and living out the dictum, "Duty first, before pleasure"; (2) Discipline, which involves staying at a task until its completion and not giving up until goals are successfully attained; (3) Results orientation, which means having the end in mind or the bottom line in any endeavor, efficiently planning and organizing one's activities and resources to meet the objectives, getting things done despite obstacles, overcoming adversities and working out blocks to achieve goals and objectives, acting with a high sense of urgency, producing outputs that meet standards of quality, successfully completing assigned tasks and paying attention to and acting on details with the knowledge and appreciation of the impact of these on the bigger context; (4) Initiative, which deals with originating actions rather than just responding to events, taking actions rather than just responding to situations, and taking a pro-active stance to influence events and taking action without prodded.

However, Collaboration has five subcomponents namely: (1) Interpersonal relations which promotes understanding, tolerating, accepting and appreciating differences of opinions and perspectives, adapting with ease to various people and temperaments and being a team player; (2) Empathy which recognizes the feelings of others, puts oneself in the shoes of others and understands and responds to the needs and concerns of others; (3) Adaptability which allows getting along well with people, relating with difficult personalities and understanding, tolerating and accepting individual and cultural differences; (4) Conflict management which handles and resolves disagreements, opposition and antagonism effectively, demonstrates flexibility of styles and

### *MOODLE: An Innovative Teaching-Learning Strategy*

strategies in resolving conflicts and appreciates differences of people and uses these differences to enhance the team; and (5) Leadership, which molds discipline, quality and excellence, assumes command of responsibility by overseeing tasks and coaching people, makes things happen through and with others, steers people towards the realization of goals, asserts a positive presence even during difficult situations to encourage team members and influences others towards worthwhile undertakings.

Moreover, Creativity has three subcomponents namely: (1) Innovativeness, which recognizes, generates and enhances new ideas, employs creative strategies in solving problems, challenges the process, employs new approaches of solving problems by bringing in perspectives from other disciplines and makes ordinary things extraordinary and makes extraordinary things ordinary; (2) Research, which engages in a systematic investigation of truth for the purpose of creating new awareness, new insights and new knowledge and develops an inquisitive mind; (3) Cognitive flexibility, which deals with having an open mind towards new and different approaches, being open to learning and sharing, and translating new ideas and images into a practical and concrete reality.

The subcomponents of the 5Cs were adapted in evaluating the effectiveness of MOODLE as a teaching learning strategy among College Students taking Science, Psychology and Nursing subjects.

## **METHODOLOGY**

### **Research Design**

The researchers used the descriptive method which has been designed to describe systematically the characteristics of a given population or area of interest, factually, and accurately (Fraenkel and Wallen, 2008). The descriptive research usually makes some types of comparison, contrasts and correlation and other times, in carefully

planned and orchestrated descriptive research, cause-effect relationship.

Based on the ECS Teaching Quality Research Reports (August, 2003), "Solid qualitative research that illuminates the specific content of education coursework must be tightly linked to rigorous quantitative research that measures course and program impact." This prompted the researchers to use a combination of qualitative and quantitative research.

### **Population**

This research used three (3) groups of respondents for the MOODLE questionnaire with a total of 123 respondents composed of 13 Psychology students enrolled in Biology with HIV, 12 psychology students in Psychology of Personal Growth and Adjustment (PPGA) and 98 nursing students in Nutrition with Diet Therapy.

### **Respondents of the Study**

The number of respondents was determined by purposive non-random sampling. All of the students in Biology, PPGA and Nutrition subjects are considered in this study since all of them are exposed to MOODLE as a teaching-learning strategy for the entire semester.

### **Research Instruments**

The survey-questionnaire which is the main data-gathering tool aimed to see how the respondents perceived the effectiveness of MOODLE as a teaching-learning strategy. The instrument contains a total of 15 questions and divided into 5 parts corresponding to the components of the 5Cs namely: (1) Competence – knowledge, self-knowledge and life-long learning, (2) Character – integrity, conviction and honoring, (3) Commitment to achieve – responsibility, discipline and initiative, (4) Collaboration – interpersonal relations, adaptability and leadership, and (5) Creativity – innovativeness, research and cognitive flexibility.

To make it easier for the respondents, the researchers decided to use a Questionnaire-Checklist with a space provided for respondents who wish to write comments for

*MOODLE: An Innovative Teaching-Learning Strategy*

areas of strength and improvement. The instruction and course of the respondent were also included in the questionnaire. The name of the respondent is optional.

For the description of respondents' view, the researchers used a 5-point Likert scale to interpret the mean and mean averages of the respondents' views per questionnaire item.

Table 1: Description of Respondents' Views

Numerical Scale	Description		Statistical Limit		
5	Outstanding	O	4.20	-	5.00
4	Very satisfactory	VS	3.40	-	4.19
3	Satisfactory	S	2.60	-	3.39
2	Below satisfactory	BS	1.80	-	2.59
1	Poor	P	1.00	-	1.79

**Validation of the Survey Questionnaire**

The research survey questionnaire was validated by Ms. Avelina L. Mandin, Chairperson of Counseling and Psychological Services, Dr. Albert E. Lupisan, SISC College Director and Dr. Remedios D. Lagera, Director for Institutional Research, Communications and Publications.

**Statistical Treatment of Data**

Descriptive and inferential statistics were used in the treatment of the data gathered.

The following descriptive statistics were used.

Mean. The Mean is the average or mathematical center of the data (Fraenkle and Wallen, 2008). This was used in the study to show the averages of the data that were gathered to determine the average GPA of TEP students in each TEI and also to determine the average rating of the TEIs based on the responses of the respondents in the questionnaire.

Percentage. According to Tan (2006), the percentage determines the proportion of a part to a whole such as a given number of respondents in relation to the sample population. This was used to determine the proportion of each group of respondents' mean scores specifically in their views of the various aspects of the BTEP that they assessed. Likewise, this was used to determine what proportions of the respondents were rated outstandingly relevant/effective, significantly relevant/effective, moderately relevant/effective, slightly relevant/effective, or not relevant/effective.

**B. Inferential Statistics**

Pearson's chi-square test ( $\chi^2$ ) is one of a variety of chi-square tests statistical procedures whose results are evaluated by reference to the chi-square distribution. It tests a null hypothesis that the relative frequencies of occurrence of observed events follow a specified frequency distribution. Chi-square is calculated by finding the difference between each observed and theoretical frequency, squaring them, dividing each by the theoretical frequency, and taking the sum of the results. This was used to find out if there were significant differences in the responses of the respondents

## PRESENTATION, ANALYSIS AND INTERPRETATION

Specific Question 1. What are the perceptions of college students on the effectiveness of MOODLE as a teaching-learning strategy in Science, Psychology and Nursing subjects based on the following dimensions?

### 1.1. Competence

The 5Cs include competence, character, commitment to achieve, collaboration and creativity. In the context of the 5Cs in SISC, competence deals with knowledge, self-knowledge, and love for learning or lifelong learning. Knowledge deals with promoting gathering of information about the topics in class based on the uploaded handouts.

Figure 4 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in knowledge and the highest of which is 85% which was given by Biology students. The lowest rate given was three (3) and this was found only among 8% of the Nursing students. Overall, majority of the college students in all subjects believe that the handouts posted in the MOODLE aid them in gaining more information especially in Biology because this subject deals with a lot of scientific and medical terminologies.

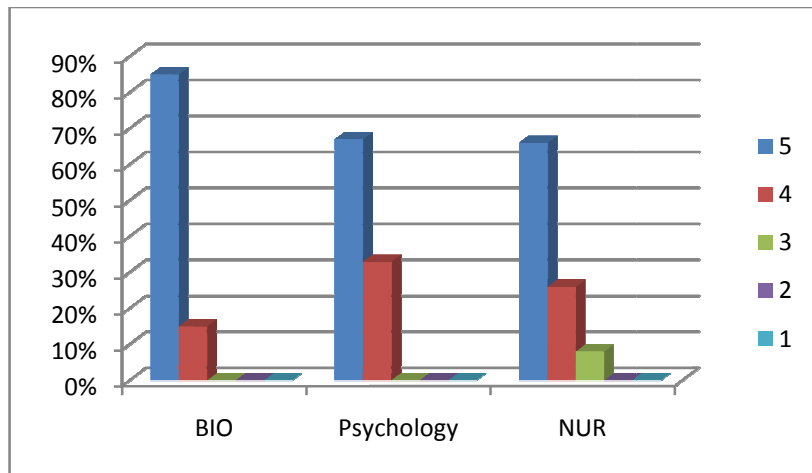


Figure 4. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Knowledge

In the context of competence, self knowledge deals with creating a vision of the future through careful planning of how to gather information based on the posted course outline. Figure 5 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in self knowledge and the highest of which is 69% which was given by Biology students. The lowest rate given was three (3) and this was found in both 8% of the Psychology and 9% of the Nursing students. Overall, majority of the college students in all subjects still believe that MOODLE facilitates learning via posted course outline because this serves as a guide on they can gather information needed in the topics to be discussed for the day.

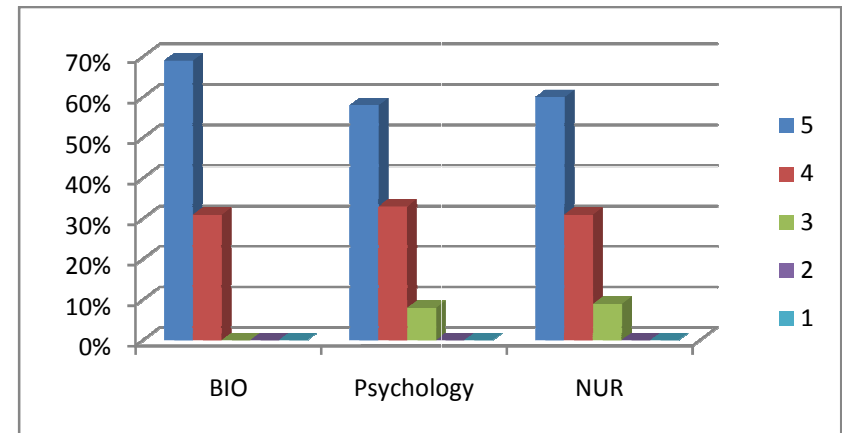


Figure 5. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Self Knowledge

In the context of competence, lifelong learning deals with manifests enduring passion for learning by using technology, communication and other tools for ongoing growth and development. Figure 6 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in lifelong learning and the highest of which is 77% which was given by Biology students. The lowest rate given

### MOODLE: An Innovative Teaching-Learning Strategy

was one (1) and this was found in only 1% of the Nursing students. Overall, majority of the college students in all subjects would like to use computer teaching strategy as a tool for learning and they believe that MOODLE can advance their knowledge in technology.

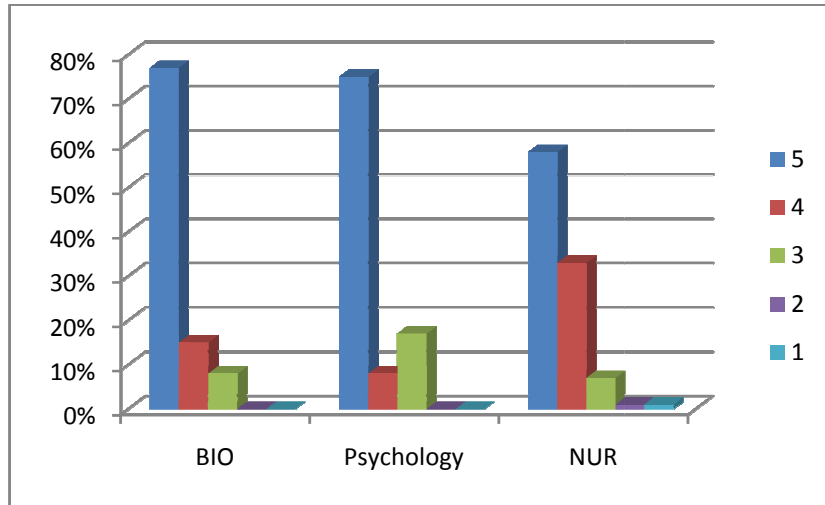


Figure 6. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Lifelong Learning

Overall, of the three (3) parameters under competence, knowledge is rated the highest while lifelong learning is rated as the lowest in all subjects. Furthermore, the Biology students generally gave the highest ratings in all parameters while the Nursing students gave the lowest ratings in all parameters.

#### 1.2. Character

In the context of the 5Cs in SISC, this deals with integrity, conviction, congruence, ethics and honoring. Integrity deals with encouraging intellectual honesty. Figure 7 shows that more than 50% of the college students, enrolled in all Biology and Nursing subjects, gave a rating of five (5) in integrity and the highest of which is 62% which was given by

Biology students. The lowest rate given was one (1) and this was found in 1% of the Nursing students. Overall, majority of the college students still believe that MOODLE encourages intellectual honesty to some extent although 42% of the Psychology students gave a rating of four (4).

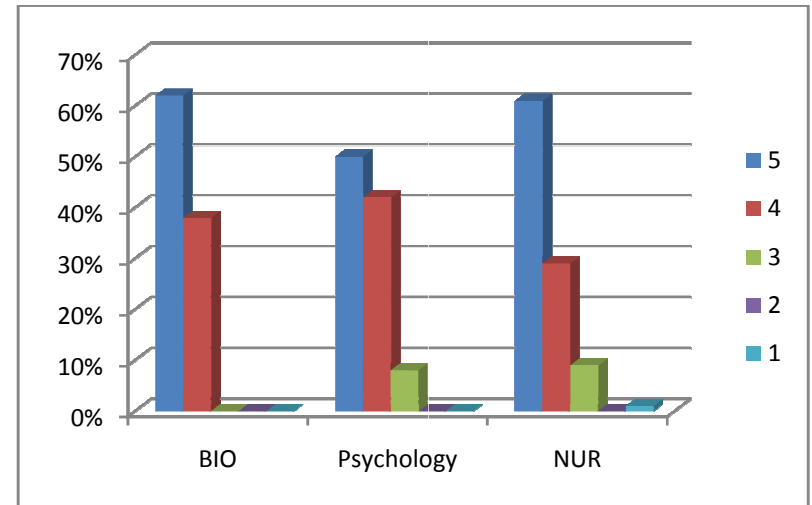


Figure 7. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Integrity

In the context of character, Conviction deals with upholding one's accountability for one's own behavior. Figure 8 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in conviction and the highest of which is 77% which was given by Biology students. The lowest rate given was one (1) and this was found in 1% of the Nursing students. Overall, majority of the college students in all subjects still believe that MOODLE can train them to become accountable for their own actions.

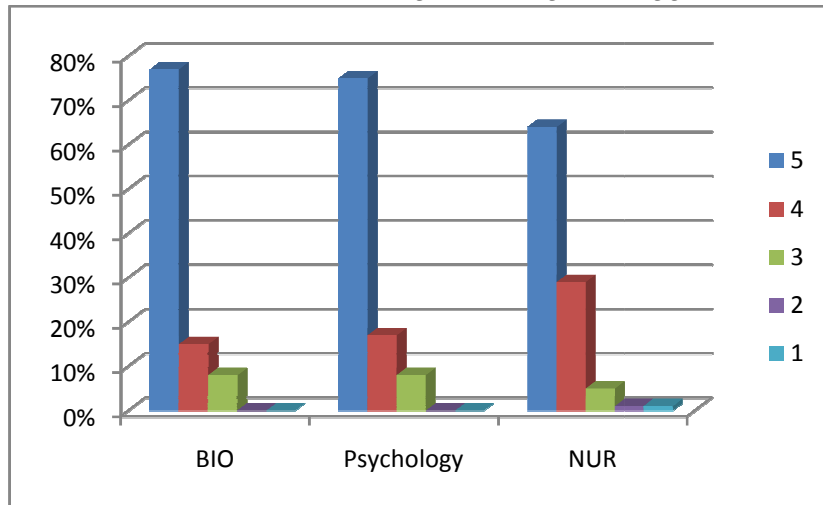


Figure 8. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Conviction

In the context of character, Honoring deals with enhancing accessibility of the lessons/topics in class. Figure 9 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in honoring and the highest of which is 85% which was given by Biology students. The lowest rate given was three (3) and this was found in 25% of the Psychology students. Overall, majority of the college students in all subjects still believe that MOODLE will help them access their lessons or topics in class with ease. With regards to the response of the Psychology students, they mentioned in their comments for improvement that some of them do not have computers at home so they only rent or used the computers at the library. According to them, they always have a difficult time logging in because of network problems.

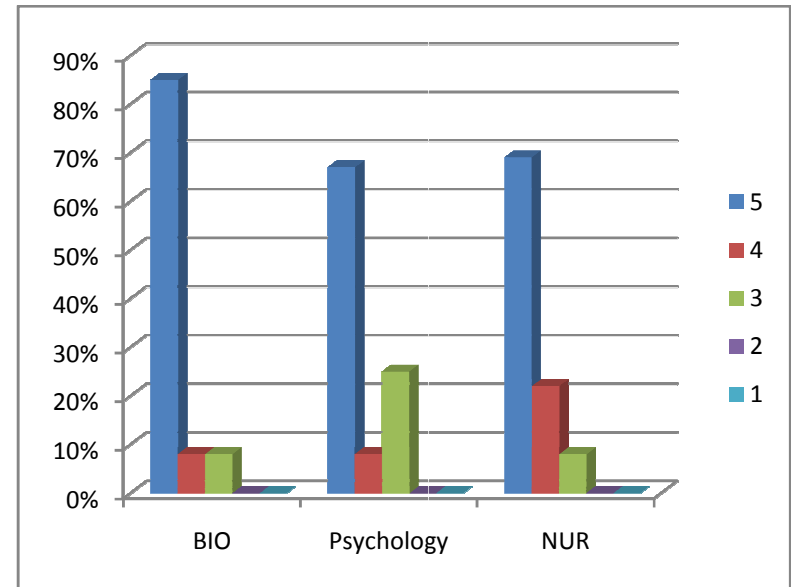


Figure 9. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Honoring

Generally, of the three (3) parameters under character, conviction is rated the highest while integrity is rated as the lowest in all subjects. Furthermore, the Biology students gave the highest ratings in all parameters while the Nursing students gave the lowest ratings.

### 1.3. Commitment to achieve

In the context of the 5Cs in SISC, this deals with responsibility, discipline, results orientation and initiative. Responsibility deals with facilitating lecture-discussion via downloading of handouts and reading materials in advance. Figure 10 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in responsibility and the highest of which is 85% which was given by Biology students. The lowest rate given was two (2) and this was found in 1% of the Nursing students. Overall, majority of the college students in all subjects still believe that MOODLE facilitate learning if they are responsible

*MOODLE: An Innovative Teaching-Learning Strategy*

enough to download handouts and reading materials in advance so that they can be prepared for their classes.

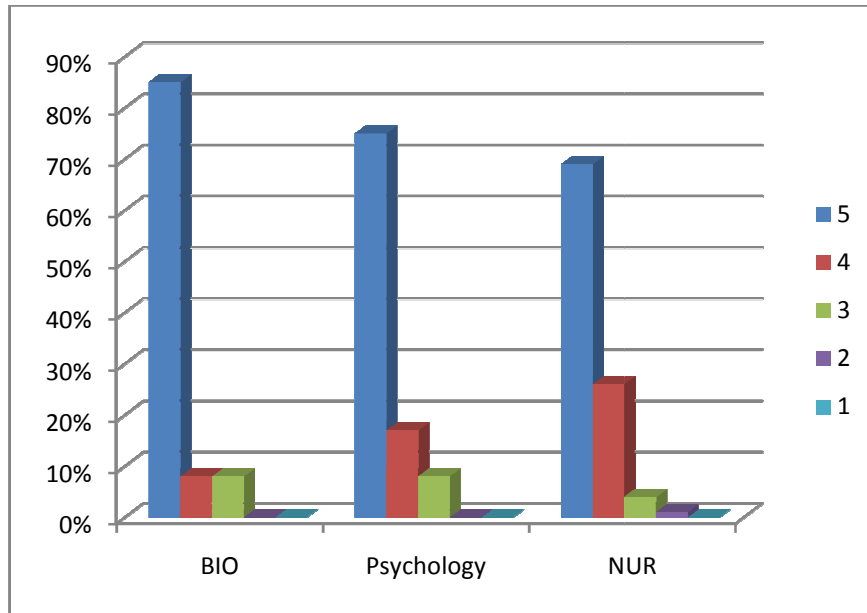


Figure 10. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Responsibility

In the context of commitment to achieve, Discipline deals with developing reliability by uploading accomplished assignments on time or earlier even if these require longer hours of work. Figure 11 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in discipline and the highest of which is 92% which was given by Biology students. The lowest rate given was one (1) and this was found in 1% of the Nursing students. Overall, majority of the college students in all subjects still believe that uploading their assignments via MOODLE will help them to develop discipline.

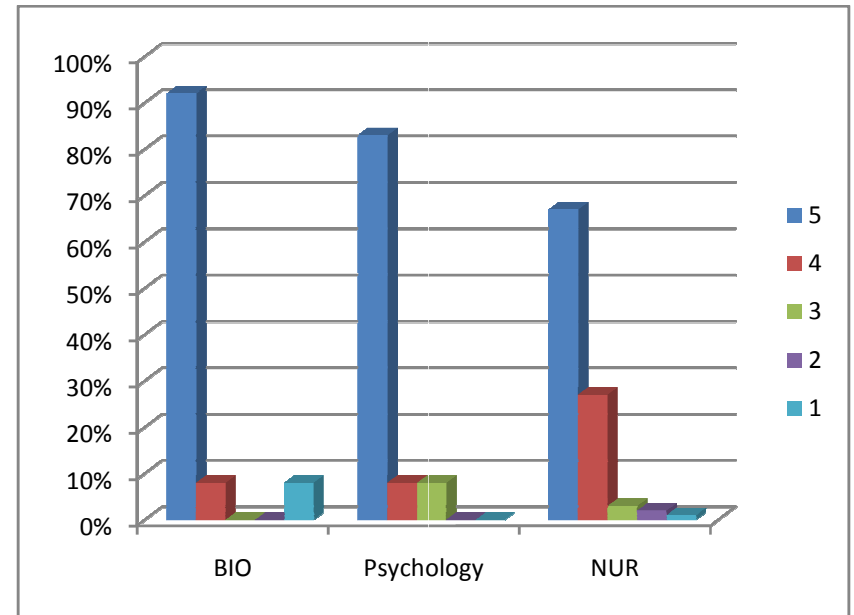


Figure 11. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Discipline

In the context of commitment to achieve, Initiative deals with promoting initiative by logging in and checking the latest updates regularly. Figure 12 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in initiative and the highest of which is 69% which was given by Biology students. The lowest rate given was two (2) and this was found in 2% of the Nursing students. Overall, majority of the college students in all subjects still believe that by logging and checking updates regularly, MOODLE can teach them to develop initiative.

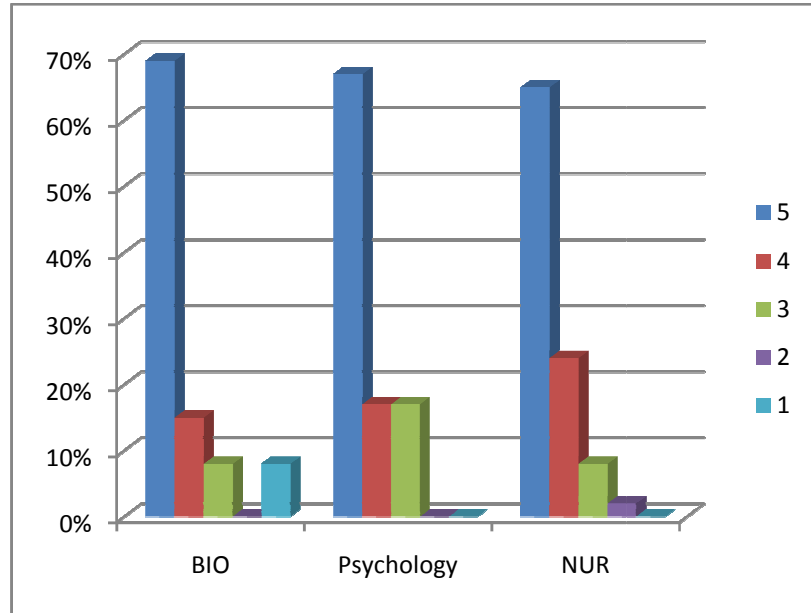


Figure 12. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Initiative

Overall, of the three (3) parameters under commitment to achieve, discipline is rated the highest while initiative is generally rated as the lowest. Furthermore, the Biology students generally gave the highest ratings in all parameters while the Nursing students gave the lowest ratings in all parameters.

#### 1.4. Collaboration

In the context of the 5Cs in SISC, this deals with interpersonal relations, adaptability and leadership. Interpersonal relations deal with making efforts in order to unite members of the group or get to know more classmates and instructors. Figure 13 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in interpersonal relations and the highest of which is 93% which was given by Biology students. The lowest rate given was one (1) and this was found in 1% of the Nursing students. Overall, majority of the college students in all subjects still believe that MOODLE can help the students

cultivate unity among their group mates, classmates or instructors.

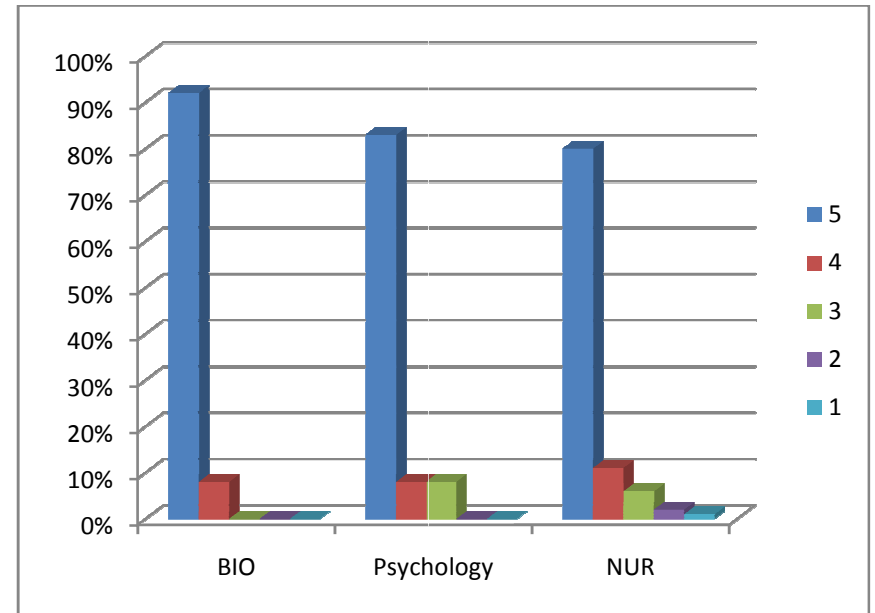


Figure 13. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Interpersonal Relations

In the context of collaboration, Adaptability deals with doing one's part/responsibilities when doing group work. Figure 14 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in adaptability and the highest of which is 92% which was given by Biology students. The lowest rate given was one (1) and this was found in 1% of the Nursing students. Overall, majority of the college students in all subjects still believe that MOODLE promotes division of labor which is more convenient for the group to complete their tasks.

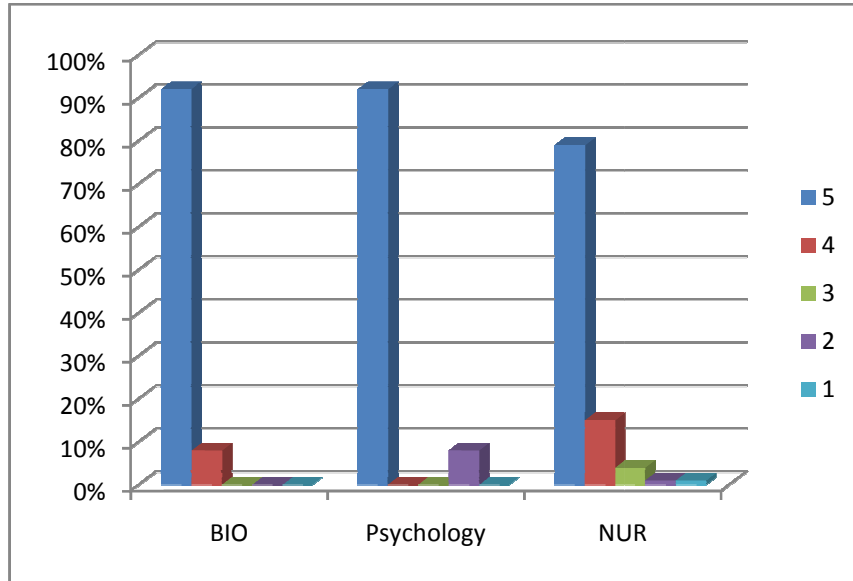


Figure 14. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Adaptability

In the context of collaboration, Leadership deals with encourages leadership by informing classmates of lessons/assignments when they are absent. Figure 15 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in leadership and the highest of which is 92% which was given by Biology students. The lowest rate given was one (1) and this was found in 1% of the Nursing students. Overall, majority of the college students in all subjects still believe that even if they are absent, MOODLE can update them through the aid of the group leaders.

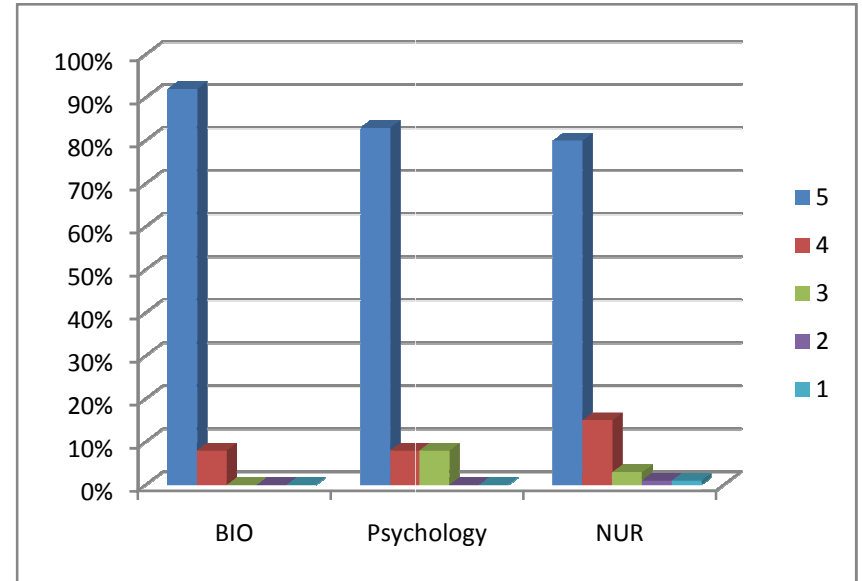


Figure 15. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Leadership

Overall, of the three (3) parameters under collaboration, leadership is rated the highest while interpersonal relations is rated as the lowest in all subjects. Furthermore, the Biology students generally gave the highest ratings in all parameters while the Nursing students gave the lowest ratings in all parameters.

### 1.5. Creativity

In the context of the 5Cs in SISC, this deals with innovativeness, research, cognitive flexibility. Innovativeness deals with supporting creative strategies in order to solve problems or improve presentation of information such as graphic organizer or concept maps, tables, graphs, or drawings. Figure 16 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in innovativeness and the highest of which is 100% which was given by Biology students. The lowest rate given was two (2) and this was found in 1% of the Nursing students. Overall, majority of the college students in all subjects still believe

*MOODLE: An Innovative Teaching-Learning Strategy*

that MOODLE improves presentation of information which could facilitate their learning process.

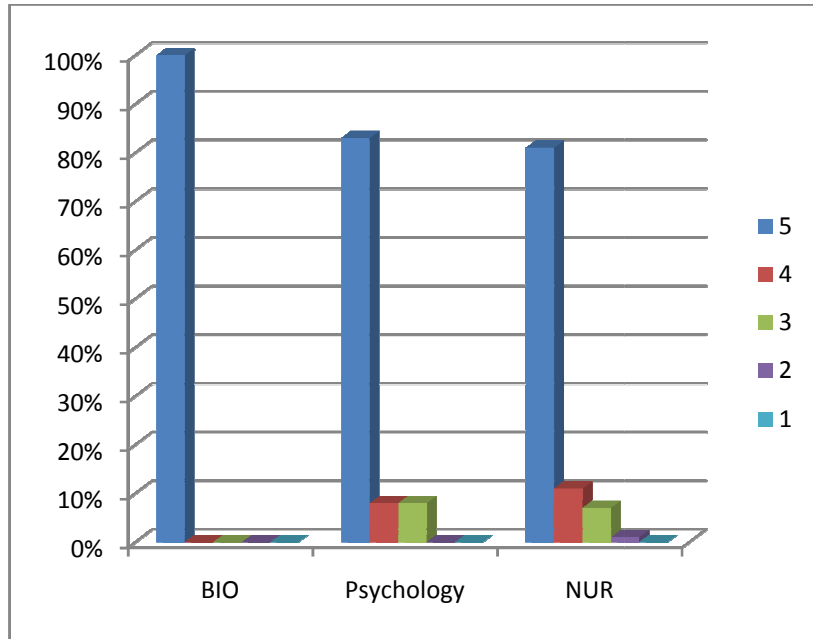


Figure 16. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Innovativeness

In the context of creativity, Research deals with engaging in a systematic investigation of truth for the purpose of creating new awareness, new insights and new knowledge for further enrichment or enhancement of the assignments/researches/projects. Figure 17 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in research and the highest of which is 100% which was given by Biology students. The lowest rate given was two (2) and this was found in 2% of the Nursing students. Overall, majority of the college students in all subjects still believe that MOODLE drives them to get involved with research.

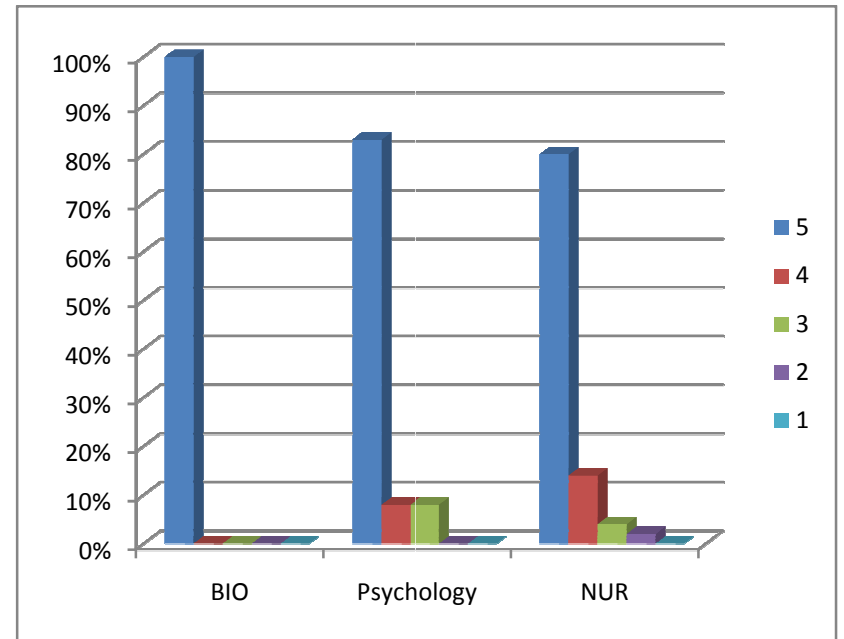


Figure 17. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Research

In the context of creativity, Cognitive flexibility deals with visualizing creative ideas, be resourceful by knowing where to gather or obtain information or materials to get something done or putting together past and present or current data in order to suit current situations. Figure 18 shows that more than 50% of the college students, enrolled in all 3 subjects, gave a rating of five (5) in cognitive flexibility and the highest of which is 100% which was given by Biology students. The lowest rate given was one (1) and this was found in 1% of the Nursing students. Overall, majority of the college students in all subjects still believe that MOODLE allows them to relate past lessons to current topics.

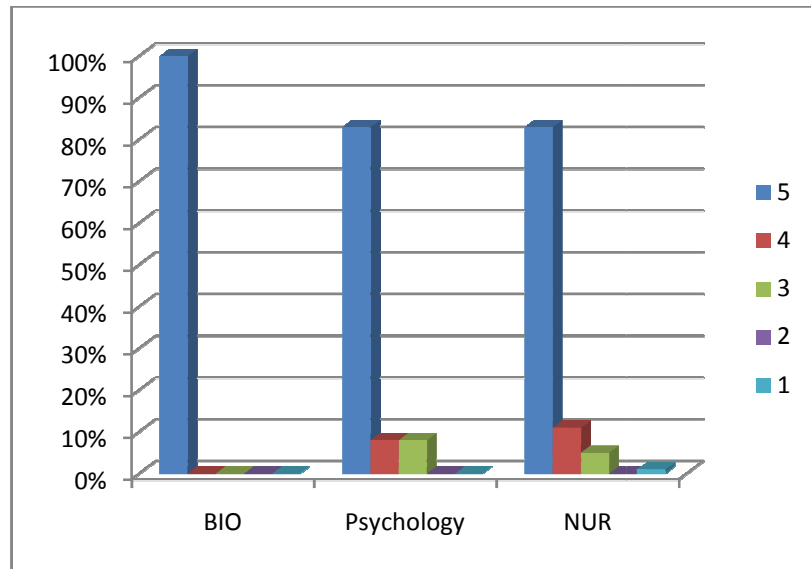


Figure 18. Percentage Ratings of Biology, Psychology and Nursing Students Regarding Cognitive Flexibility

Overall, all the parameters under creativity are rated the highest with the Biology students giving the highest ratings while the Nursing students giving the lowest ratings.

Specific Question 2. What are the areas of strengths of MOODLE as a teaching-learning strategy as perceived by the college students in Science, Psychology and Nursing subjects based on the following dimensions?

### 2.1. Competence

Table 2 shows the comments of college students on MOODLE’s area of strength on competence. Regarding knowledge, the college students in all subjects stated that uploaded handouts are informative because they can rely on it. They can concentrate on the discussion of the lesson since they have more time to listen than take down notes. The handout is also very helpful because it is easily accessible, can be reprinted if misplaced and they do not have to go to look for their professors. This process is also cost effective because

there is no need to photocopy. They can have a hard copy by just printing at home or have a soft copy in their computers.

For the self knowledge, the posted outline is very helpful in planning because it has all the lessons and guidelines. This way, the students can easily track down all the information needed for the next lecture, know updates about our course and about the subject and can access on the course outlines in case the students are lost during the lesson.

For lifelong learning, the students mentioned that MOODLE is user friendly and it can help them gain more knowledge on technology and apply what they have learned.

Table 2 Summary on the Comments of College Students on MOODLE’s Areas of Strength based on Competence.

	BIOLOGY	PSYCHOLOGY	NURSING
Knowledge	Handouts are updated  Handouts are easily accessible and can be reprinted if misplaced  Uploaded handouts are informative	Handouts are updated  Handouts are easily accessible  Uploaded handouts are informative	Handouts are updated  Handouts are easily accessible  Uploaded handouts are informative because if students cannot take down notes in class, they can rely on Moodle for handouts  Students do not have to go through the burden of looking for the professors  Uniform handouts/information given to all students/sections  Very good idea to

*MOODLE: An Innovative Teaching-Learning Strategy*

	BIOLOGY	PSYCHOLOG Y	NURSING
			replace yahoo groups of students Very cost effective because there is no need to photocopy
Self-knowledge	Posted course outline can help the student study ahead of time	Outline is posted beforehand to make students be prepared for the class	Posted outline is very helpful in planning It has all the lessons and guidelines Can know the topics in advance Easily tracks down all the information needed for the next lecture Easier to know updates about our course and about the subject Easy access on the course outlines in case the students are lost during the lesson It is organized Detailed lesson plan Awesome! This can also be applied in other subjects especially IC classes

	BIOLOGY	PSYCHOLOG Y	NURSING
Lifelong learning	It advances the knowledge of students in computer technology	Students gain more knowledge on technology	Learn more about computers and apply what the students have learned  Open to technology  User friendly and helpful

2.2. Character

Table 3 shows the comments of college students on MOODLE's areas of strength based on character. According to the students, MOODLE can promote honesty because only the student enrolled in that class could open his/her account. MOODLE also promotes conviction by teaching the students to be accountability to their own actions since a deadline is set in each assigned task. In addition, MOODLE promotes honoring since the students appreciated its accessibility especially when they would like to review anywhere, when they are sick or when they have lost their handouts.

Table 3 Summary on the Comments of College Students on MOODLE's Areas of Strength based on Character.

	BIOLOGY	PSYCHOLOG Y	NURSING
Integrity		It cannot be opened by other students	Promotes honesty
Conviction	Moodle has a	It has a deadline.	It teaches discipline in having to know

*MOODLE: An Innovative Teaching-Learning Strategy*

	deadline		deadlines It definitely helps the students become more responsible with their homeworks
Honoring	Moodle is appreciated by students because it is user friendly especially when the students are sick.	It is user friendly because the students can review anywhere as long as there is a net and can download the handouts again if they are lost	It is user friendly because it gives the outlines or what to be studied for that week, able to access the lessons easily and protects credibility

2.3. Commitment to achieve

Table 4 shows the comments of college students on MOODLE's areas of strength based on commitment to achieve. Since the handouts are already posted, the students become responsible in downloading the reading materials provided so that they can study in advance. MOODLE uploads discipline since there is a deadline set for every assignment and late submission is not allowed. In line with this, time management is being developed in each student. There is also less chance of misplacing assignments since there is a note that the assignment is uploaded successfully. It is also cost effective since they can also pass the assignments at home without printing. MOODLE also develops initiative because they are asked to check for updates by logging in from time to time.

Table 4 Summary on the Comments of College Students on MOODLE's Areas of Strength based on Commitment to Achieve.

	BIOLOGY	PSYCHOLOGY	NURSING
Responsibility		All handouts are posted	Convenient way of learning and studying the topics  The students have access to the teacher's handouts making studying easier because notes can be browsed  Gives students time to study in advance because students have a chance to look ahead at what will be taught
Discipline	Upholds time management because late submission is not allowed		Because of the strict deadline  It is very easy for us to pass our assignments on time  The students can pass their requirements at home or anywhere without the hassle of printing  Less chance of misplacing assignments that are passed

*MOODLE: An Innovative Teaching-Learning Strategy*

Initiative	Makes the students be more responsible in checking daily updates	It pushes me to work hard	The students will know the latest lessons/news about the course  Gives us more information on our progress  Teaches discipline in checking the site for updates
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2.4. Collaboration

Table 5 shows the comments of college students on MOODLE's areas of strength based on collaboration. Only the nursing students placed their comments on this area. The researches assumed that they really appreciated collaboration since they belong to a large class. The students stated that MOODLE promotes unity among their group and class. They can also easily communicate with their group mates and even instructors by consulting them via sending messages. MOODLE can also update students even if they are absent in class.

Table 5. Summary on the Comments of College Students on MOODLE's Areas of Strength based on Collaboration.

	BIOLOGY	PSYCHOLOGY	NURSING
Interpersonal relations			Promotes unity  Promotes unity especially during group submissions  Can ask the teacher by sending messages
Adaptability			Easy to contact peers

Leadership			Gives chance for those who are absent
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2.5. Creativity

Table 6 shows the comments of college students on MOODLE's areas of strength based on creativity. MOODLE promotes creativity since it is more interactive. The students can design their works before uploading.

Table 6. Summary on the Comments of College Students on MOODLE's Areas of Strength based on Creativity.

	BIOLOGY	PSYCHOLOGY	NURSING
Innovativeness			Promotes creativity
Research			
Cognitive flexibility	Help students design their works		More interactive

Specific Question 3. What are the areas of improvement of MOODLE as a teaching-learning strategy as perceived by the college students in Science, Psychology and Nursing subjects based on the following dimensions?

3.1. Competence

Table 7 shows the comments of college students on MOODLE's areas of improvement based on competence. In all dimensions, the students mentioned the network problem. They could not log in or download handouts because the server is slow in both school and at home. It is costly for those who are only renting computers outside the school premises. They also observed that the sudden change in the

*MOODLE: An Innovative Teaching-Learning Strategy*

MOODLE icon in our Southville website is confusing to those who are not familiar with computer technology. Other comments for improvement include improving the template, layout or design of the MOODLE and increasing its uploading capacity.

Table 7. Summary on the Comments of College Students on MOODLE's Areas of Improvement based on Competence.

	BIOLOGY	PSYCHOLOGY	NURSING
Knowledge	Slow login	Keeps on changing the Moodle icon in the website	<p>Do not keep changing the layout of the Moodle icon</p> <p>Problem with internet availability in school because the network/server is slow</p> <p>Difficult to download the handouts due to network problem</p> <p>The system should be updated and always in top shape because sometimes students cannot access it</p> <p>If students do not have internet at home, it can be costly for them</p> <p>There are people who only depend on uploaded handouts</p>

Self-knowledge		Slow logging in	Nothing to improve
Life-long learning	Not user friendly during network problem	Better to pass assignments personally	<p>Not everyone has free and unlimited access to a computer or internet</p> <p>Can improve on the template and designs</p> <p>Low upload capacity</p>

**3.2.Character**

Table 8 shows the comments of college students on MOODLE's areas of improvement based on character. In all dimensions, the network problem is still the main concern. Regarding integrity, there is a higher chance of copying assignments since they can share works with other students. Some students are suggesting for a part wherein they can upload notes to share with classmates especially during reporting.

Table 8. Summary on the Comments of College Students on MOODLE's Areas of Improvement based on Character.

	BIOLOGY	PSYCHOLOGY	NURSING
Integrity		Students just send their assignments to other students	Nothing to improve
Conviction			When internet connection is lost, nothing can be done

*MOODLE: An Innovative Teaching-Learning Strategy*

			All handouts in all subjects should be uploaded
Honoring		Difficult to log in	Problem with internet availability  There should be a part wherein students can upload notes to share with classmates especially during reporting

3.3. Commitment to achieve

Table 9 shows the comments of college students on MOODLE's areas of improvement based on commitment to achieve. Aside from the network problem, the students admitted that they need to be reminded of the deadlines so they are suggesting the utilization of email alerts. They also requested that school activities and prelim/midterm/final grades should be posted for immediate feedbacking.

Table 9. Summary on the Comments of College Students on MOODLE's Areas of Improvement based on Commitment to Achieve.

	BIOLOGY	PSYCHOLOGY	NURSING
Responsibility			Server is super slow; Hard to log in
Discipline	Moodle is not working	Difficult when there is an error	When internet connection is lost at home or when

	properly  Cannot upload because the network is down	uploading due to network problem  Limited MB	there is a network problem, assignments cannot be submitted in the most appropriate moment  Students should still be reminded about assignment; maybe emails can be sent to students as reminder  Cannot upload easily due to system problem
Initiative		Cannot log in if Moodle is down	There is lag time when logging in when Moodle is down or the net is slow in school  Not all students can log in regularly because they sometimes forgot to log in  Make Moodle send messages on the email or email alerts  Place the school activities to keep

*MOODLE: An Innovative Teaching-Learning Strategy*

			the students informed  Better if grades are posted and updated
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3.4. Collaboration

Table 10 shows the comments of college students on MOODLE's areas of improvement based on collaboration. Besides network problem, they observed that the leader is the only one making the effort to go online. It is suggested that there should be a forum or chat base wherein students can communicate with each other while making their project.

Table 10. Summary on the Comments of College Students on MOODLE's Areas of Improvement based on Collaboration.

	BIOLOGY	PSYCHOLOGY	NURSING
Interpersonal relations		Most of the time, the leader is the only one who makes effort to go online	Should have a forum/chat base where students in one section can easily communicate on project due in Moodle
Adaptability			It is hard especially during deadlines because the server tends to slow down if we all upload at the same time
Leadership		Not all students can access Moodle	Nothing to improve

3.5. Creativity

Table 11 shows the comments of college students on MOODLE's areas of improvement based on creativity. Generally, they did not state any comments on creativity but only a suggestion for an allotted portion wherein they could upload their researches.

Table 11. Summary on the Comments of College Students on MOODLE's Areas of Improvement based on Creativity.

	BIOLOGY	PSYCHOLOGY	NURSING
Innovativeness			Nothing to improve
Research			Should have an upload area where students can upload information they researched or created
Cognitive flexibility			Nothing to improve

Specific Question 4. Is there a significant difference on the perceptions of college students on the effectiveness of MOODLE as a teaching-learning strategy in Science, Psychology and Nursing subjects based on the following dimensions?

4.1. Competence

To compare the responses of the college students in Science, Psychology and Nursing subjects, the weighted means of each group is obtained and tabulated. In general, table 12 shows that all the parameters under competence are rated outstanding with a general weighted mean of 4.61. The highest rating was given to knowledge at 4.70 and the lowest to self knowledge at 4.57.

**Table 12. Summary of the Perception of College Students on MOODLE as a Teaching-Learning Strategy based on Competence.**

Competence	Biology		Psychology		Nursing		GEN. Mean Ave.	
	WM	D	WM	D	WM	D	WM	D
OVER-ALL MEAN AVERAGES	4.74	O	4.58	O	4.52	O	4.61	O
Knowledge	4.85	O	4.67	O	4.58	O	4.70	O
Self knowledge	4.69	O	4.5	O	4.51	O	4.57	O
Lifelong learning	4.69	O	4.58	O	4.46	O	4.58	O

Legend:  
 WM – Weighted Mean  
 D – Description

4.2.Character

In general, table 13 shows that all the parameters under character are rated outstanding with a general weighted mean of 4.58. The highest rating was given to conviction at 4.63 and the lowest to integrity at 4.51.

**Table 13. Summary of the Perception of College Students on MOODLE as a Teaching-Learning Strategy based on Character.**

Character	Biology		Psychology		Nursing		GEN. Mean Ave.	
	WM	D	WM	D	WM	D	WM	D
OVER-ALL MEAN AVERAGES	4.69	O	4.50	O	4.55	O	4.58	O
Integrity	4.62	O	4.42	O	4.49	O	4.51	O
Conviction	4.69	O	4.67	O	4.54	O	4.63	O
Honoring	4.77	O	4.42	O	4.61	O	4.60	O

Legend:  
 WM – Weighted Mean  
 D – Description

4.3. Commitment to achieve

In general, table 14 shows that all the parameters under commitment to achieve are rated outstanding with a general weighted mean of 4.64. The highest rating was given to discipline at 4.75 and the lowest to initiative at 4.47.

**Table 14. Summary of the Perception of College Students on MOODLE as a Teaching-Learning Strategy based on Commitment to Achieve.**

Commitment	Biology		Psychology		Nursing		GEN. Mean Ave.	
	WM	D	WM	D	WM	D	WM	D
OVER-ALL MEAN AVERAGES	4.69	O	4.64	O	4.58	O	4.64	O
Responsibility	4.77	O	4.67	O	4.63	O	4.69	O
Discipline	4.92	O	4.75	O	4.57	O	4.75	O
Initiative	4.38	O	4.50	O	4.53	O	4.47	O

Legend:  
 WM – Weighted Mean  
 D – Description

4.4. Collaboration

In general, table 15 shows that all the parameters under collaboration are rated outstanding with a general weighted mean of 4.78. The highest rating was given to both adaptability and leadership at 4.79 and the lowest to interpersonal relations at 4.75.

**Table 15. Summary of the Perception of College Students on MOODLE as a Teaching-Learning Strategy based on Collaboration.**

Collaboration	Biology		Psychology		Nursing		GEN. Mean Ave.	
	WM	D	WM	D	WM	D	WM	D
OVER-ALL MEAN AVERAGES	4.92	O	4.72	O	4.69	O	4.78	O
Interpersonal relations	4.92	O	4.67	O	4.66	O	4.75	O
Adaptability	4.92	O	4.75	O	4.69	O	4.79	O
Leadership	4.92	O	4.75	O	4.71	O	4.79	O

Legend:  
 WM – Weighted Mean  
 D – Description

4.5.Creativity

In general, table 16 shows that all the parameters under creativity are rated outstanding with a general weighted mean of 4.82. The highest rating was given to cognitive flexibility at 4.83 and the lowest are given to innovativeness and research at 4.82.

Table 16. Summary of the Perception of College Students on MOODLE as a Teaching-Learning Strategy based on Creativity.

Creativity	Biology		Psychology		Nursing		GEN. Mean Ave.	
	WM	D	WM	D	WM	D	WM	D
OVER-ALL MEAN AVERAGES	5.00	O	4.75	O	4.72	O	4.82	O
Innovativeness	5.00	O	4.75	O	4.71	O	4.82	O
Research	5.00	O	4.75	O	4.71	O	4.82	O
Cognitive Flexibility	5.00	O	4.75	O	4.74	O	4.83	O

Legend:

WM – Weighted Mean

D – Description

Synthesis

To summarize the responses of college students on MOODLE as teaching-learning strategy in Science, Psychology and Nursing subjects based on 5Cs, Table 17 shows that MOODLE received a general rating of 4.69 which is outstanding. The highest rating given was given to Creativity at 4.82. This is followed by collaboration, commitment to achieve, knowledge and character in descending order.

Table 17. Summary of the Perception of College Students on MOODLE as a Teaching-Learning Strategy based on 5Cs.

5Cs	Biology		Psychology		Nursing		GEN. Mean Ave.	
	WM	D	WM	D	WM	D	WM	D
OVER-ALL MEAN AVERAGES	4.81	O	4.64	O	4.61	O	4.69	O
Competence	4.74	O	4.58	O	4.52	O	4.61	O
Character	4.69	O	4.50	O	4.55	O	4.58	O
Commitment	4.69	O	4.64	O	4.58	O	4.64	O
Collaboration	4.92	O	4.72	O	4.69	O	4.78	O
Creativity	5.00	O	4.75	O	4.72	O	4.82	O

To test if there is a significant difference in the perceptions of college students on MOODLE as teaching-learning strategy in Science, Psychology and Nursing subjects, the following critical regions is set:

Critical region: Reject Ho if  $X^2c > X^{26}$

Reject Ho if  $X^2c > 12.59$

Table 18 shows the chi-square computation on the perception of college students on MOODLE as a teaching-learning strategy based on the 5Cs. All of the dimensions fall below 12.59 critical region. Therefore, there is no significant difference in the view of all the college students on Moodle as Teaching-Learning Strategy in Science, Psychology and Nursing subjects based on the 5Cs.

Table 18. Summary of the Chi-square Computation on the Perception of College Students on MOODLE as a Teaching-Learning Strategy based on the 5Cs.

5Cs	X <sup>2c</sup>	Decision	Conclusion
Competence	1.997508	Since 1.99 < 12.59, accept Ho	No significant difference between the views
Character	2.103724	Since 2.10 < 12.59, accept Ho	No significant difference between the views
Commitment	2.175038	Since 2.17 < 12.59, accept Ho	No significant difference between the views
Collaboration	7.671996	Since 7.68 < 12.59, accept Ho	No significant difference between the views

Creativity	5.511393	Since 5.51 < 12.59, accept Ho	No significant difference between the views
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## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This study wanted to assess the effectiveness MOODLE as a teaching-learning strategy in Science, Psychology and Nursing subjects through the views of the college students in SISC (Southville International School and Colleges in Las Pinas City) for the Second Semester, Academic year 2008-2009. Specifically, the research find out the following: (1) Perceptions of college students on the effectiveness of MOODLE as a teaching-learning strategy in Science, Psychology and Nursing subjects based on the 5Cs; (2) Areas of strengths of MOODLE as a teaching-learning strategy as perceived by the college students in Science, Psychology and Nursing subjects based on the 5Cs; (3) Areas of improvement of MOODLE as a teaching-learning strategy as perceived by the college students in Science, Psychology and Nursing subjects based on the 5Cs; and (4) Difference on the perceptions of college students on the effectiveness of MOODLE as a teaching-learning strategy in Science, Psychology and Nursing subjects based on the 5Cs.

The study assumed that all the respondents were taught about the process of using the MOODLE in Science, Psychology and Nursing subjects and they answered the questionnaire truthfully and to the best of their ability. This study was propelled by the hypothesis that there are no significant differences among the respondents' views on MOODLE as a teaching-learning strategy in Science, Psychology and Nursing subjects. Furthermore, this research will be a great help to the SISC management, college instructors and students and future researches.

*MOODLE: An Innovative Teaching-Learning Strategy*

The researchers used the descriptive method with a combination of qualitative and quantitative research. There were three (3) groups of respondents for the MOODLE questionnaire with a total of 123 respondents composed of 13 Psychology students enrolled in Biology with HIV, 12 psychology students in Psychology of Personal Growth and Adjustment (PPGA) and 98 nursing students in Nutrition with Diet Therapy. All of the students in Biology, PPGA and Nutrition subjects are considered in this study since all of them are exposed to MOODLE as a teaching-learning strategy for the entire semester. The validated survey-questionnaire was divided into 5 parts corresponding to the components of the 5Cs namely: (1) Competence – knowledge, self-knowledge and life-long learning, (2) Character – integrity, conviction and honoring, (3) Commitment to achieve – responsibility, discipline and initiative, (4) Collaboration – interpersonal relations, adaptability and leadership, and (5) Creativity – innovativeness, research and cognitive flexibility. A 5-point Likert scale was adapted to interpret the mean and mean averages of the respondents' views per questionnaire item. Descriptive and inferential statistics were used in the treatment of the data gathered. Mean and percentage were used for the descriptive statistics while Pearson's chi-square test was utilized for inferential statistics.

## **Major Findings**

Based on the data gathered, the following are the major findings:

1. Of the three (3) parameters under competence, knowledge is rated the highest while lifelong learning is rated as the lowest in all subjects. Furthermore, the Biology students generally gave the highest ratings in all parameters while the Nursing students gave the lowest ratings in all parameters.
2. Generally, of the three (3) parameters under character, conviction is rated the highest while integrity is rated as the lowest in all subjects. Furthermore, the Biology students gave the highest ratings in all parameters while the Nursing students gave the lowest ratings.
3. Overall, of the three (3) parameters under commitment to achieve, discipline is rated the highest while initiative is generally rated as the lowest. Furthermore, the Biology students generally gave the highest ratings in all parameters while the Nursing students gave the lowest ratings in all parameters.
4. Among the three (3) parameters under collaboration, leadership is rated the highest while interpersonal relations is rated as the lowest in all subjects. Furthermore, the Biology students generally gave the highest ratings in all parameters while the Nursing students gave the lowest ratings in all parameters.
5. All the parameters under creativity are rated the highest with the Biology students giving the highest ratings while the Nursing students giving the lowest ratings
6. The following are the comments of college students on MOODLE's area of strength on competence.
  - a. For knowledge, uploading handouts in the MOODLE can be informative, helpful and cost effective.
  - b. For the self knowledge, the posted outline in MOODLE is very helpful in planning.
  - c. For lifelong learning, MOODLE is user friendly and it can help them gain more knowledge on technology and apply what they have learned.
7. The following are comments of college students on MOODLE's areas of strength based on character.
  - a. MOODLE can promote honesty because only the student enrolled in that class could open his/her account.
  - b. MOODLE also promotes conviction by teaching the students to be accountability to their own actions since a deadline is set in each assigned task.
  - c. MOODLE promotes honoring since the students appreciated its accessibility especially when they would like to review anywhere, when they are sick or when they have lost their handouts.
8. The following are comments of college students on MOODLE's areas of strength based on commitment to achieve.
  - a. Students become responsible in downloading the reading materials provided so that they can study in advance.
  - b. MOODLE uploads discipline since there is a deadline set for every assignment and late submission is not allowed.
  - c. MOODLE also develops initiative because they are asked to check for updates by logging in from time to time
9. The following are comments of college students on MOODLE's areas of strength based on collaboration.

*MOODLE: An Innovative Teaching-Learning Strategy*

- a. MOODLE promotes unity among their group and class.
  - b. Students can also easily communicate with their group mates and even instructors by consulting them via sending messages.
  - c. MOODLE can update students who are absent in class.
10. The following are comments of college students on MOODLE's areas of strength based on creativity.
- a. MOODLE promotes creativity since it is more interactive.
  - b. The students can design their works before uploading.
11. In all dimensions, the comments of college students on MOODLE's areas of improvement centered on the network problem which hindered their logging in, checking of updates, downloading of handouts and uploading of assignments. Aside from that the following are other areas to be improved or considered:
- a. For competence, the sudden change in the MOODLE icon in our Southville website is confusing to those who are not familiar with computer technology. They suggest improving the template, layout or design of the MOODLE and increasing its uploading capacity.
  - b. For character, there is a higher chance of copying assignments since they can share works with other students. Some students are suggesting for a part wherein they can upload notes to share with classmates especially during reporting.
  - c. For commitment to achieve, the students admitted that they need to be reminded of the deadlines. Suggestions include email alerts and posting of school activities and  
prelim/midterm/final grades for immediate feedbacking.
- d. For collaboration, the leader is the only one making the effort to go online. It is suggested that there should be a forum or chat base wherein students can communicate with each other while making their project.
  - e. Generally, there was no comment on creativity but only a suggestion for an allotted portion wherein they could upload their researches.
12. All the parameters under competence are rated outstanding with a general weighted mean of 4.61. The highest rating was given to knowledge at 4.70 and the lowest to self knowledge at 4.57.
13. All the parameters under character are rated outstanding with a general weighted mean of 4.58. The highest rating was given to conviction at 4.63 and the lowest to integrity at 4.51.
14. All the parameters under commitment to achieve are rated outstanding with a general weighted mean of 4.64. The highest rating was given to discipline at 4.75 and the lowest to initiative at 4.47.
15. All the parameters under collaboration are rated outstanding with a general weighted mean of 4.78. The highest rating was given to both adaptability and leadership at 4.79 and the lowest to interpersonal relations at 4.75.
16. All the parameters under creativity are rated outstanding with a general weighted mean of 4.82. The highest rating was given to cognitive flexibility at 4.83 and the lowest are given to innovativeness and research at 4.82.

### *MOODLE: An Innovative Teaching-Learning Strategy*

17. MOODLE received a general rating of 4.69 which is outstanding. The highest rating given was given to Creativity at 4.82. This is followed by collaboration, commitment to achieve, knowledge and character in descending order.
18. Therefore, there is no significant difference in the views of all the college students on Moodle as Teaching-Learning Strategy in Science, Psychology and Nursing subjects based on the 5Cs.

### **Conclusions**

Based on the major findings, the following are concluded:

1. The college students in Science, Psychology and Nursing subjects perceived MOODLE as an outstanding Teaching-Learning Strategy based on 5Cs.
2. The college students believed that MOODLE is very effective in implementing 5Cs through gathering of knowledge via uploaded handouts, promoting conviction, upholding discipline via time management, developing adaptability and leadership and facilitating cognitive flexibility
3. The major area of improvement for MOODLE is the network problem which hindered the students' ability to log in, check updates, download handouts and upload assignments.
4. There is no significant difference in the views of all the college students on Moodle as Teaching-Learning Strategy in Science, Psychology and Nursing subjects based on the 5Cs.

### **Recommendations**

Based on the results of the study, the following are recommended:

- Similar studies for further validation of the results of this study with the following parameters:

- Larger sample size since this research was only limited to only Biology, PPGA and Nutrition and Diet Therapy students.
- Face-to-face interview of all the respondents to support the claim during the discussion
- Include the views of the college instructors on MOODLE as a teaching-learning strategy
- Longer duration so that a series of testing will be implemented. Due to time constraint, MOODLE survey was only conducted once and done during the final examination. The author would like to suggest that the survey will be repeated and conducted every after semester.
- A correlational study on the effectiveness of MOODLE based on the views and the actual grades obtained by the students.
- Similar correlational studies applied to another group of respondents such as :
  - College and Basic Education students
  - College and Basic Education faculty members
- Results of this study can be used as basis for implementation, revision or improvement of MOODLE as a teaching-learning strategy based on the 5Cs.

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