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Implementing the Civil Engineering Orientation Course in the Revised BSCE Curriculum at De La Salle University

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Abstract

This paper presents the pilot implementation of the Civil Engineering Orientation (CEORIEN) course in the revised Bachelor of Science in Civil Engineering curriculum at De La Salle University. The CEORIEN course was designed based on outcomes-based education (OBE) principles where student outcomes, learning outcomes, teaching and learning activities and assessment are constructively aligned. The course syllabus and student-centered learning activities are described. Moreover, surveys conducted related to understanding student's perception about the course are also presented.

Key Words: civil engineering, orientation, specialization, outcomes-based education

1. Introduction

Republic Act No. 10533, otherwise known as the "Enhanced Basic Education Act of 2013," was approved on May 15, 2013, and took effect on June 8, 2013 for implementation by the Department of Education (DepEd), the Commission on Higher Education (CHED), and the Technical Education and Skills Development Authority (TESDA) [1]. One of the major impacts to higher education of RA 10533 is the addition of two (2) years of senior high school (SHS) education. As a result, the Commission of Higher Education (CHED) has to revise the various curricula in the colleges and universities. In October 24, 2017, the CHED through the Technical Panel for Engineering and Technology (TPET) adopted The Policies, Standards and Guidelines (PSG) for the Bachelor of Science in Civil Engineering (BSCE) effective Academic Year 2018-2019 [2]. Among the changes in the BSCE curriculum are the reduction of number of years for completion to a minimum of four years with 171 credit units, revision of course offerings and introduction of 15 units of specialized professional courses. One of the new courses introduced in the revised curriculum is a two-unit course on Civil Engineering Orientation with a course description described in the PSG as "Introduction to various tracks of specialization of civil engineering, emphasis on ethics, responsibility and professionalism." The Department of Civil Engineering at De La Salle University, in compliance to the CHED directive implemented the revised curriculum including the introduction of the course on Civil Engineering Orientation or CEORIEN. This paper presents the pilot implementation of CEORIEN course for freshmen during the 3rd Term of AY2018-2019.

2. The CEORIEN Syllabus

The main components of the syllabus of CEORIEN is described in this section. The CEORIEN course was designed based on outcomes-based education (OBE) principles where student outcomes, learning outcomes, teaching and learning activities and assessment are constructively aligned as described in Oreta and Roxas [3].

2.1. Course Description

This course introduces freshmen civil engineering students to the broad field of Civil Engineering and assists them in determining the area(s) of specialization they might want to follow for their bachelor's

degree. This course will cover introduction to the professional practice of civil engineering, overview of the various specializations within the disciplines of civil engineering and the roles that engineers in each of the major areas of specialization within civil engineering have in the design and construction process, career opportunities, professional licensing and legal issues, industry expectations in the professional disciplines, importance of student outcomes in the curriculum in preparing the student for professional practice.

2.2 Student and Course Learning Outcomes

CEORIEN targets two Expected Lasallian Graduate Attributes (ELGA). Lasallian civil engineers are expected to be (a) Service-Driven Citizens and (b) Effective Communicators five years after graduation. These ELGAs are aligned to the following Student Outcomes in Table 1.

Table 1. Student Outcomes

SO	Student Outcome
SO-D	*An ability to work effectively in multi-disciplinary and multi-cultural teams.*
SO-F	*An understanding of the effects and impact of civil engineering projects on nature and society*
SO-G	*An ability to effectively communicate orally and in writing*
SO-I	*An ability to engage in life-long learning and an acceptance of the need to keep current of the development in the specific field of specialization*

Upon completion of the course, the students are expected to be able to do the following learning outcomes (LO) listed in Table 2.

Table 2.CEORIEN Course Learning Outcomes

LO	Leanrning Outcomes
LO1	*Describe the Civil Engineering Law and its relevant sections related to the ethical practice of the profession, licensure exams and continuing professional development;*
LO2	*Describe what civil engineering is, what a civil engineer does, the skills required to be a competent professional civil engineer and the impacts of a civil engineer's work to society;*
LO3	*Identify the different career opportunities and activities of a civil engineer and the various fields of specialization and the required skills, knowledge & responsibilities and activities of a civil engineer and a specialist;*
LO4	*Describe the knowledge, skills and values that are emphasized in the CE curriculum for preparing students to become competent professional civil engineers; and*
LO5	*Develop a plan of study to meet curriculum requirements and personal objectives*

2.3 The Learning Plan

To achieve the student and course learning outcomes, teaching and learning activities (TLA) in the classroom during lecture hours and outside of the classroom were designed. Class lectures were conducted using PowerPoint (PPT) slides and complemented with short video presentations. Prior to the implementation of CEORIEN, CE faculty members were assigned to develop specific PPT modules including identifying useful online video to complement the lectures. These teaching modules were compiled and made available to the CEORIEN professors to assure that the minimum content for the lectures are delivered and shared to the students via Google Drive (Figure 1).

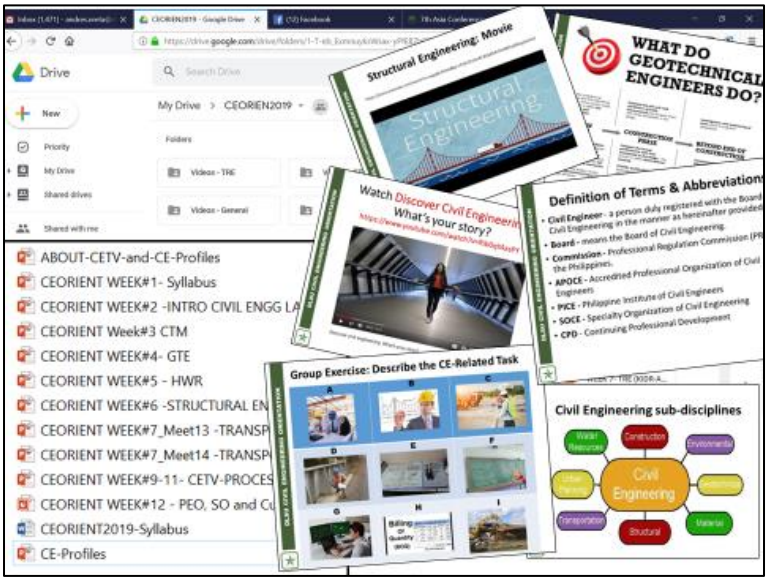

Figure 1. CEORIEN Teaching & Learning Modules

The one-term schedule of CEORIEN which consists of 14 weeks with two one-hour lectures per week is summarized in Table 3.

Table 3. Schedule of Lectures, Assignments and Other Activities

Week	Topics / Activities
1	*Presentation of the syllabus and Self-Introduction of students*
2	*Lecture/Video on RA544 or the CE Law and Discussion on What is civil engineering and what civil engineers do. Briefing on Assignment#1*
3	*Lecture/Video on Construction Technology & Management Specialization*
4	*Lecture/Video on Geotechnical Engineering Specialization*
5	*Lecture/Video on Hydraulics & Water Resources Engineering Specialization*
6	*Lecture/Video on Structural Engineering Specialization*
7	*Lecture/Video on Transportation Engineering Specialization*
8	*Summary of CE Specializations and Presentation of Assignment#2 – My Future & CE Specialty*
9	*Briefing on Group Projects: CETV & CE Profiles / Video on SDGs & Impact of CE to society*
10	*Professional CE Specialty Symposium (ProCESS)*
11	*Group Presentations of Civil Engineering Technical Visuals CETV)*
12	*Lecture on the OBE CE Curriculum and Specs Program / Video on Important Skills of a Civil Engineer*
13	*Group Presentations of CE Profiles*
14	*Final Exam*

2.4 Course Requirements and Assessment

The course requirements consist of individual assignments, group projects and a final exam. These student-centered learning activities are designed to assess the student's achievement of the course learning outcomes. Described in Table 4 are the course requirements for CEORIEN.

Table 4. CEORIEN Course Requirements

Requirement	Description
Assignment#1 (10%):	*What/Why Civil Engineering? – Write an essay on why you enrolled in BSCE. What is civil engineering and its contribution and impact to society?*
Assignment#2 (10%):	*My Future & CE Specialty. Design a one slide PPT poster. Imagine yourself five years after graduation. Choose at least one CE specialization and describe what you may be doing as a civil engineer. What should you do to pursue your dream with respect to continuous learning, professional and skills development?*
CETV (20%)	*Civil Engineering Technical Visuals - An infographics group project. The group will be required to design a short video, slide show presentation or other form of infographics (e.g. poster, brochure or a pamphlet) that presents the impact and relevance of civil engineering and civil engineers to society. The theme for this term is CE and the Sustainable Development Goals (SDGs).*
Profiles (40%)	*"Profile of a Civil Engineer"- The final group project requires the students to identify a practicing civil engineer. They must conduct an interview on his/her education, training, skills and present work and achievements. The final output will be a written report and oral presentation (PPT, slideshow and/or video).*
Final Exam (20%)	*A multiple-choice comprehensive exam to assess the students' understanding about civil engineering as a profession and its impact to society.*

2.5 Online Learning Resources

The teaching and learning resources used in the delivery of the course consists of the PPT slides used in the lectures which were shared to the students online. Links to the YouTube videos are also shared. Listed in Table 5 are some of the video presented in class or required for viewing online.

Table 5. Examples of Online Videos and YouTube Links

Title	Link
Discover civil engineering (4:13)	*https://www.youtube.com/watch?v=Rib0qYAxsPY*
What is civil engineering? by ICE (4:50)	*https://www.youtube.com/watch?v=y4B19Mdi6Mg*
What is civil engineering? By MajorPrep (13:53)	*https://www.youtube.com/watch?v=bFljMHTQ1QY&t=160s*
What is CE & what civil engineers do? (5:40)	*https://www.youtube.com/watch?v=zsBc2W0K5zA&t=50s*
Why CE and civil engineers are important (3:02)	*https://www.youtube.com/watch?v=NFc_3dUvfXY*
Pros & Cons of being a civil engineer (10:00)	*https://www.youtube.com/watch?v=kYEhKzBJUqo*
7 most important skills for a CE to succeed (4:43)	*https://www.youtube.com/watch?v=r11l4x-lmjo*
The Little DVD of Civilization (10:40)	*https://www.youtube.com/watch?v=fRgOkOfWBGg*
Great Engineering Structures (6:50)	*https://www.youtube.com/watch?v=qnIUcNoSh4w*
Structural Eng'g is indispensable to society (4:30)	*https://www.youtube.com/watch?v=TeKRV_57ZXo*
Structural Eng'g: A Gift to Society (4:47)	*https://www.youtube.com/watch?v=X3fBpujvycY*

3. The Pilot Implementation

CEORIEN was offered to BSCE freshmen students during the 3rd Term of AY 2018-2019. It must be mentioned that these freshmen students belong to the first batch of students who completed two years of senior high school. There were four sections; each section was handled by different faculty members (the four authors).

3.1 Student Survey on Why Civil Engineering?

During the first two weeks of classes, an online survey on "Why Civil Engineering" was conducted to understand the family background and interests of the students and why they enrolled in BSCE. Figures 2 to 5 show the results of the survey.

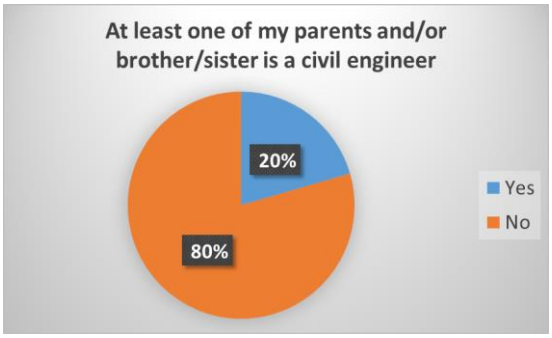

Figure 2. Family Background

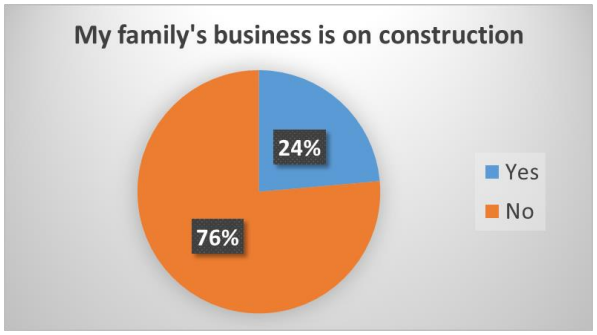

Figure 3. Family Business

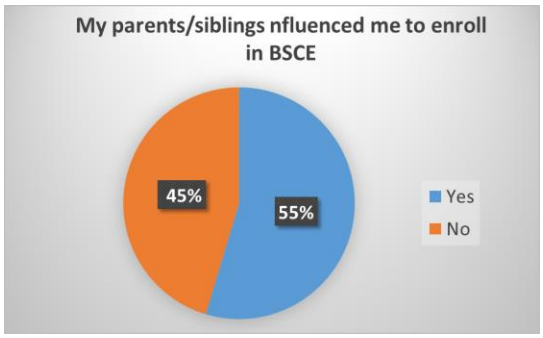

Figure 4. Family Influence

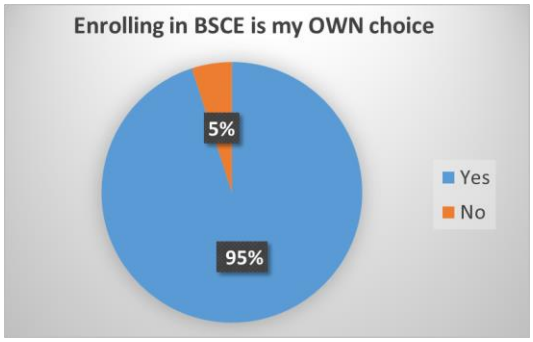

Figure 5. Student's Choice

The survey shows that only a minority of the students (20 to 24%) have parents/siblings who are civil engineers or a family business related to construction. Although there is an influence from parents and relatives for about 55% for the students to enroll in BSCE, still there were 40% for a total of 95% who stated that enrolling in BSCE was their personal choice. This is a good indicator that the students were not "forced" to take BSCE and hopefully this translates to a self-motivated behavior towards studying the various courses in the BSCE curriculum.

Figure 6 asked the students to choose reasons on why they want to be a civil engineer. This question was aimed to determine their understanding on what a civil engineer does and how they look at themselves as a civil engineer in the future. The survey shows that students want to be civil engineers to build and construct structures like buildings and bridges (58% to 78%). Only 25% wants to improve water-related infrastructures. About 29% wants to work abroad and 27% wants to work in government.

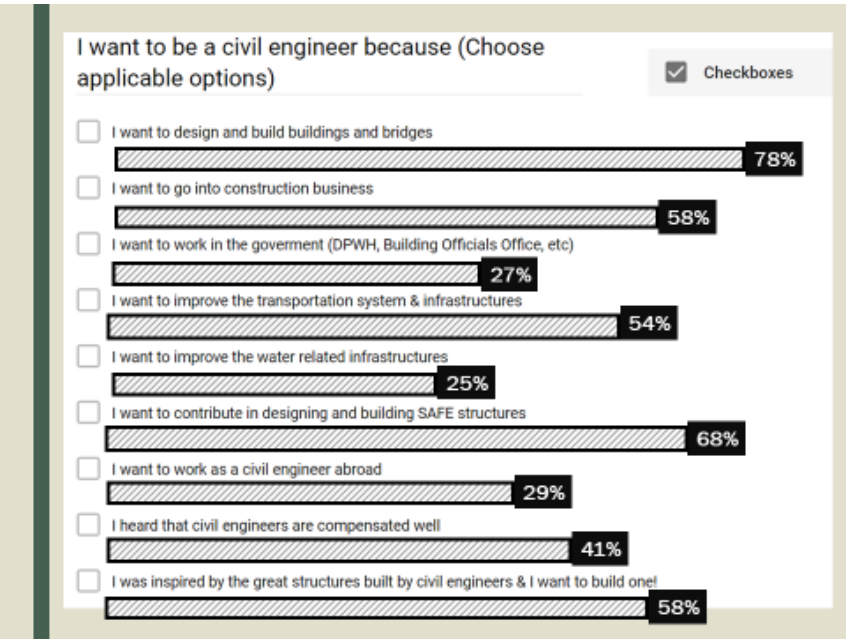

Figure 6. Reasons for being a civil engineer

3.2 Student Survey on My Future and CE Specialty

During Week 8, after the five fields of specialization were already discussed in the lectures, the students presented their outputs for Assignment#2 (Figure 7) on My Future and CE Specialty. In this assignment, each student presented a one-slide PPT poster where he/she described his/her future as a civil engineer and his/her specialization. Figure 8 shows the preferred specialization of the students where Structural Engineering (STE) ranks one followed by Construction Technology and Management (CTM). Hydraulics and Water Resources (HWR) is the least preferred specialty despite the emphasis in the lectures on the importance of water in daily living and the present water shortage.

Figure 7. My Future & CE Specialty Posters

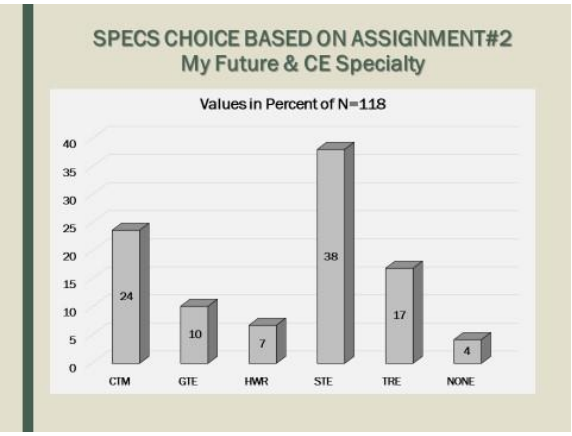

Figure 8. Students' Specialty Choices

3.3 *AHP Survey on CE Specializations*

During Week 9, another survey was conducted aimed on capturing the students' perception on the importance and impact of the five fields of CE specialization: CTM, GTE, HWR, STE and TRE to the student and to society.

An Analytic Hierarchy Process (AHP) methodology was used. In AHP, two specialty fields, A and B are compared one at a time and the students decide on which specialty A or B is more important. This pairing comparison was done for all specialties. The survey has consistency ratio (C.R.) of 0.069 which is less than 0.1; hence acceptable. The result of the AHP survey is a matrix shown in Table 6 which is used to compute the weights for each specialty.

Table 6. AHP Matrix and Results

AHP SURVEY: Which CE Specialization is important? (N=133)							
	CTM	GTE	HWR	STE	TRE	Weights	Rank
CTM	1	2.3767	2.5175	1.0712	2.3379	0.3179	1
GTE	0.4208	1	2.3519	1.4139	2.3995	0.2324	2
HWR	0.3972	0.4252	1	1.3467	2.0405	0.1574	4
STE	0.9335	0.7073	0.7426	1	3.7154	0.2074	3
TRE	0.4277	0.4168	0.4901	0.2692	1	0.0849	5
					C.R. =	0.069	< 0.1

The AHP survey shows the corresponding weights given for each specialization. CTM has the largest weight of 0.3179 followed by GTE (0.2324) and STE (0.2074). Incidentally, TRE was ranked as least important, next to HWR. The importance (Table 6) and preference (Figure 8) on CE Specialization are not directly correlated meaning students may consider a specialization as important to society but still they may prefer to pursue a different field due to personal reasons. For example, geotechnical engineering is found to be second in rank in importance but only ranks fourth in preference. It is interesting to mention the last slide in the GTE PPT lecture, "*Some unsung heroes of civil engineering … buried right under your feet*." It is possible that students' preference on their future CE specialty is influenced more on what they see around them. There is a need for more discussion and intensive information dissemination on the need for civil engineers in the other specialization especially in HWR and TRE.

3.4 *Civil Engineering Technical Visuals (CETV)*

One of the group assignments is the CETV where the students created an infographic (poster, brochure, and flyer) or video highlighting the impact and relevance of civil engineering and civil engineers specifically in achieving the Sustainable Development Goals (SDGs). An oral presentation was conducted for the groups to showcase their CETV products. Figure 9 shows some of the CETV outputs of the groups.

Figure 9. CETV products (posters and flyers)

3.5 Professional Civil Engineering Specialty Symposium

One of the main activity of the course is the Professional Civil Engineering Specialty Symposium (ProCESS) organized by the CEORIEN faculty in cooperation with the CE student organization, Civil Engineering Society (CES). The symposium was held on July 27, 2019 from 9:00 AM to 12:00 noon at the DLSU William Shaw Hall. The resource speakers who were invited and presented about their professional practice including their specialization are listed in Figure 10.

Figure 10. ProCESS Speakers (L-R: Madrazo, Gugol, Asis, Macabagdal & Alvarez)

ProCESS addressed learning outcomes LO2 and LO3. An indirect assessment through a reflection paper was required from the students. The reflection paper is considered as an incentive which was credited to their grades. The general feedback from the students about the symposium and the invited speakers was positive. The CE resource speakers have made an impact to the students as shown by the students' feedback in Table 7.

Table 7. Students' Feedback about ProCESS

No.	Comments
1	"*...I learned a lot from this experience .... and thankful for all the people that helped put the whole event together."*
2	" *… I realized that not all specializations are for everyone .. every student has different strengths, weaknesses and capabilities fit for a specific specialization…there is no specialization that is better than the other."*
3	*"...the talk widened my views because the speakers shared life experiences and wat we should expect after graduation."*
4	*"... Hearing from the speakers tell their experiences and tips have pushed me to study more and love the lessons being tackled in our subjects ..."*
5	*"I learned that civil engineering is not all about building infrastructures but also improving the well-being of society."*
6	*The CTM speaker.. "showed us that being a construction engineer, you need to be a good leader and communicator... no matter how smart you are but if you can't work well with people, you will not be able to accomplish much ..."*
7	*From the GTE speaker ..."I learned that the foundation where our buildings and structures are built may not be visible but they are of big importance ...I like his quote on 'no grit and guts, no glory.'"*
8	*The STE speaker ... "reminded us there is not much money in structural engineering but what drives him is the passion to design safe structures."*
9	*From the HWR speaker ..."I was very enlightened by her presentation that it made me want to be like her ...she mentioned the importance of water especially now that there is a water shortage ... for me (HWR) is one of the most important CE specializations."*
10	*The TRE speaker ..."stated that there are many future plans related to transportation like railways and airports in the Philippines but the problem is there is a lack of TRE experts."*
11	*"...overall, this symposium was very significant and beneficial ... it helped me clarify what specializations I am actually interested in ..."*

3.6 Profiles

The final group project is the "Profile of a Civil Engineer." The group interviewed a professional civil engineer about his/her education, training, skills and present work and achievements. The final output is a written report and oral presentation about the civil engineer. The project has several learning outcomes which include SO-D on teamwork and LO3 on understanding career opportunities and activities of a civil engineer and the required skills, knowledge & responsibilities of a civil engineer and a specialist. The project will also guide them on LO5 about planning their future career. Figure 11 are sample slides used in the oral presentation.

Figure 11. A Sample CE Profiles Output

3.7 Final Exam

The final exam is a multiple choice exam consisting of fifty questions that aims to assess the students' skills on remembering and understanding (the first two cognitive skills in Bloom's Taxonomy Hierarchy) about civil engineering as a profession and its role to society including the SDGs. The questions are aligned with the course learning outcomes. Examples of the final exam questions aligned with specific learning outcomes are shown in Table 8.

Table 8. Sample Final Exam Questions

LO/Topic	Multiple Choice Question
LO1- CE Law (Remembering)	*Civil Engineer who is the signatory and sealer to the building permit of a project and who is therefore professionally responsible and liable for the construction management and supervision of the project.* *(a) Project Civil Engineer* *(c) Civil Engineer-of-Record* *(b) Civil Engineer Prime Professional* *(d) Civil Engineer-In-Charge-of-Construction*
LO2 - Impact of CE (SDGs) (Understanding)	*"Safe and affordable housing and basic services and upgrade slums … safeguard the world's cultural and natural heritage" are targets related to SDG on* *(a) Good Health & Well Being* *(c) Clean Water & Sanitation* *(b) Life on Land* *(d) Sustainable Cities & Communities*
LO3 - CE Specs (Remembering)	*A CTM professional with expert knowledge on construction cost estimate, cost planning and cost management.* *(a) Field Engineer* *(c) Occupational Safety and Health Officer* *(b) Quantity Surveyor* *(d) Contract Manager*
LO4 - CE Curriculum (Understanding)	*The ELGA wherein students are expected "to generate ideas with resourcefulness, originality and insight & use innovative problem solving skills and methods."* *(a) Effective Communicator* *(c) Service Driven Citizen* *(b) Creative & Critical Thinker* *(d) Reflective Life-Long Learner*

The statistics of the raw scores of the final exam are shown in Figure 12. From a total of 163 students, for a total of 50 points, the mean is 40 with a standard deviation of 3.8. Note that there are still few students about 3 who scored low with scores less than 30. Moreover, no student got a perfect score of 50; the highest score obtained was only 48 for two students. If the outcomes-based target performance is that "70% of the students must get a score of 35 (70% correct answers)", then this target was met since the total number of students who got 35 or higher is 145 or 89%.

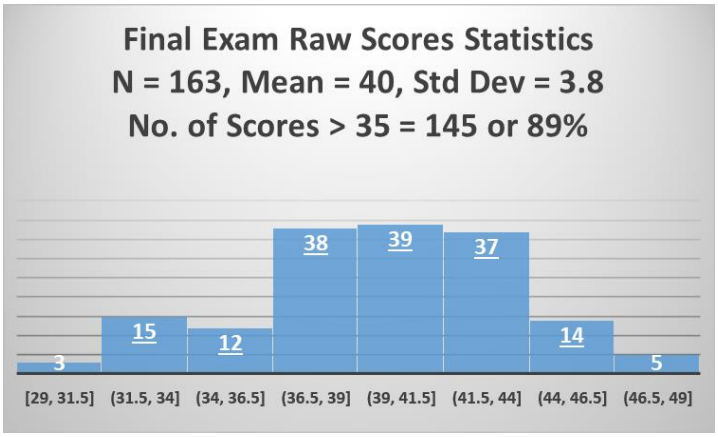

Figure 12. Final Exam Results Histogram

3.7 End-of Course Survey

At the end of the term, a final End-of-Course survey was conducted to get the students' assessment about the course delivery and requirements. The students were asked to assess specific items using a scale from 1 to 5 (1 for 'Strongly Agree' to 5 for 'Strongly Disagree'). From a total of 113 responses, the following figures below present the students' assessment. Majority or 50% or more of the responses for all questions gave 'Strongly Agree' assessments or more than 70% gave a positive feedback (combined responses of 1 for 'Strongly Agree' and 2 for 'Agree'). The assessment for the instructors was positive with about 80% (combined '1' and '2' responses). CEORIEN was assessed as important to the students' future by about 75% (combined '1' and '2' responses). There are about 3% to 10% 'Strongly Disagree' responses in specific questions with ProCESS still not enough to convince some students to decide their future specialization at 9.7% with 'Strongly Disagree' responses.

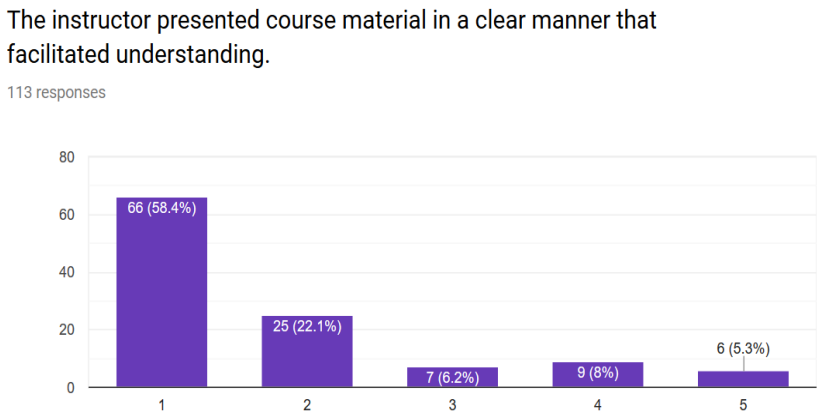

Figure 13. Assessment of Instructor's Course Delivery

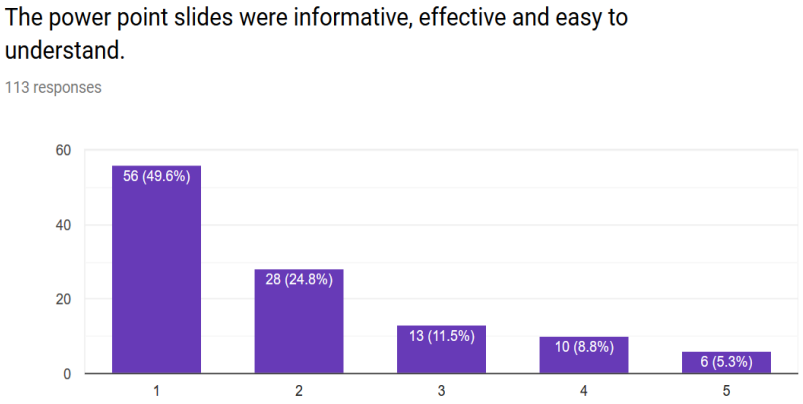

Figure 14. Assessment on PowerPoint Slides

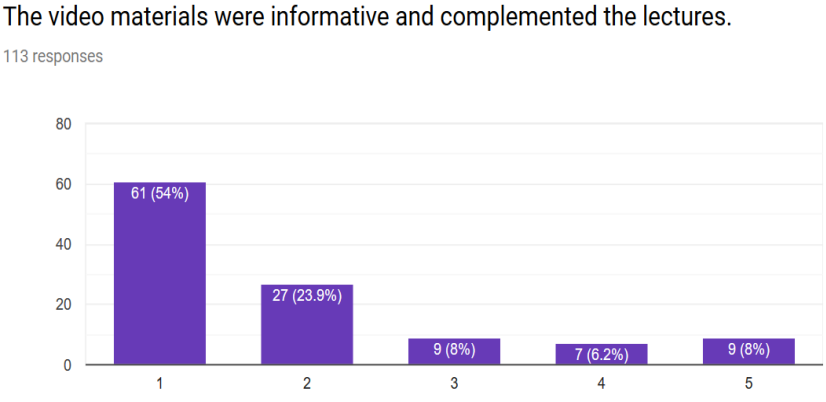

Figure 15. Assessment of Online Videos

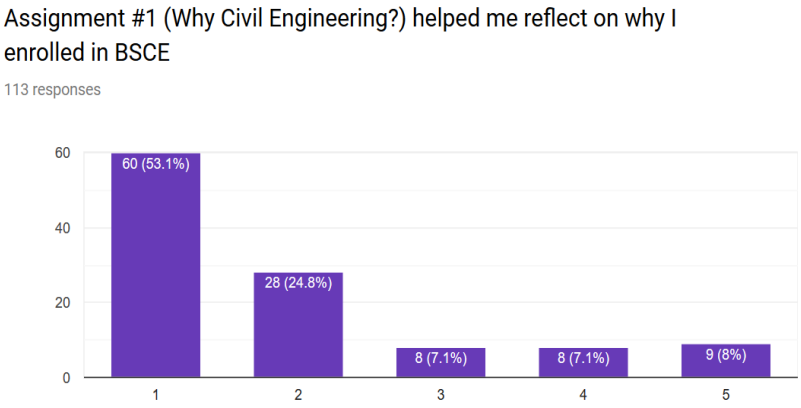

Figure 16. Assessment of Assigment#1

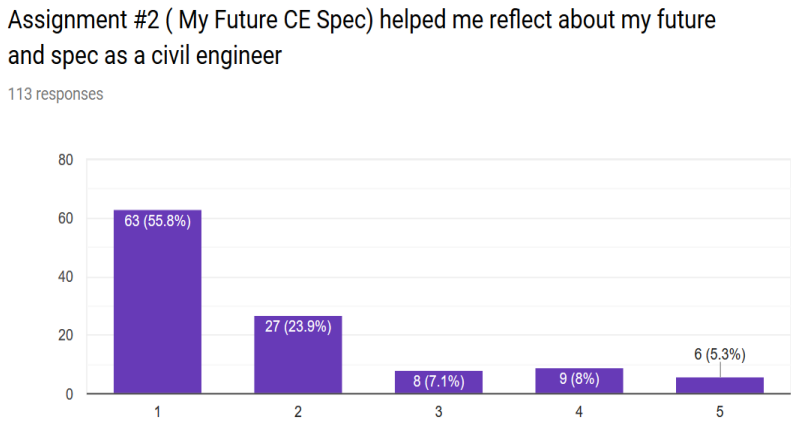

Figure 17. Assessment of Assignment#2

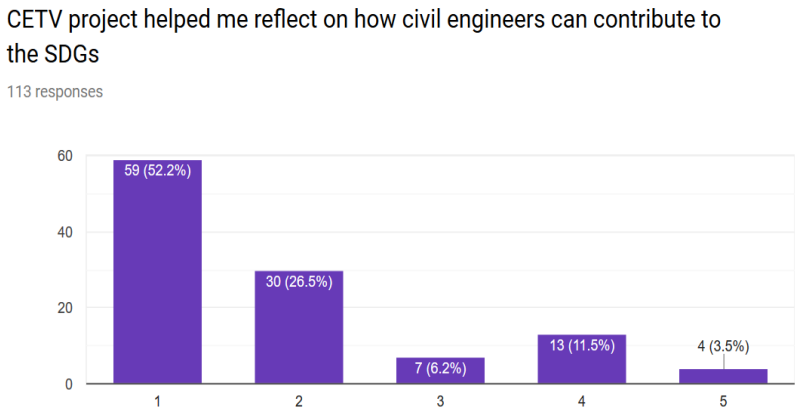

Figure 18. Assessment of CETV

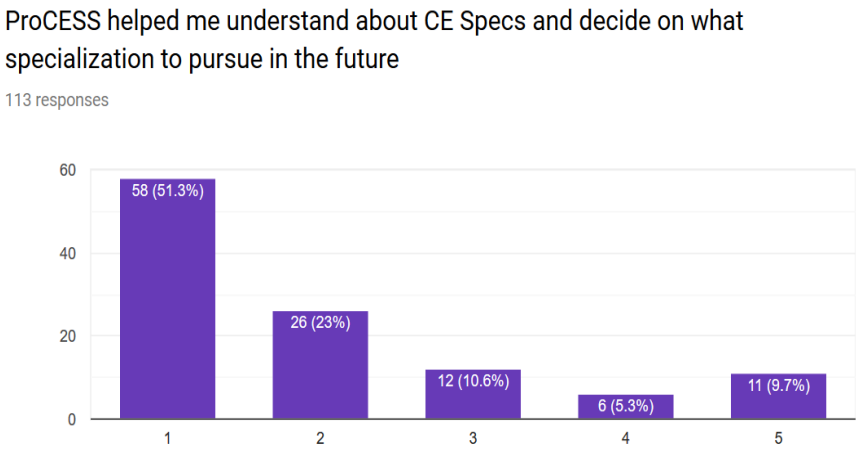

Figure 19. Assessment of ProCESS

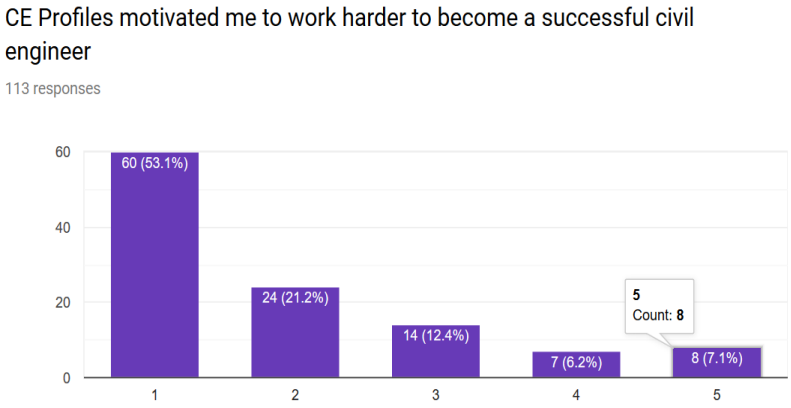

Figure 20. Assessment of Profiles

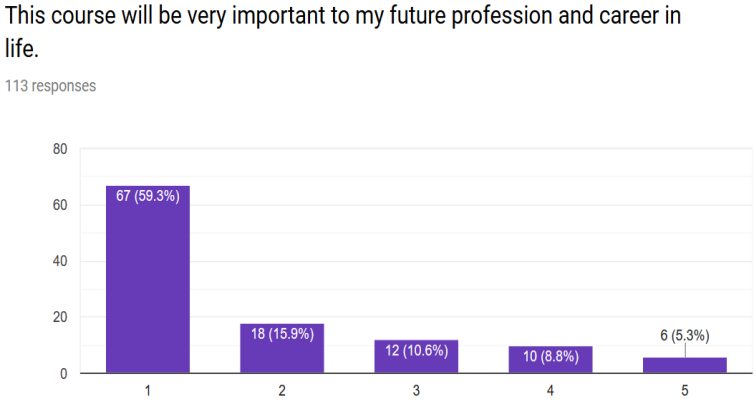

Figure 21. Assessment of Importance of CEORIEN

The students were also asked "*What parts of the course aided your learning the most*?" There were many responses that ProCESS and the lectures and discussion about the CE specializations including the teachers' life stories have the greatest impact in their appreciation of the course.

The students were also asked an open-ended question on "*What is the most important learning (knowledge, skill, value) to you from this course*?" Among the responses are shown in Table 9. Figure 22 is a group photo of one of the CEORIEN classes.

Table 9. Sample Responses to the Question on Most Important Learning in CEORIEN

No.	Comments
1	*I learned how engineering can be integrated in SDGs.*
2	*Each specialization is important and has a specific role that contributes to the betterment of the society.*
3	*Understanding the purpose of each specialization in order to determine the most suitable field has been the most valuable lesson for this course.*
4	*Civil engineering is a continuously developing field, so we must find ways to continuously improve ourselves as well.*
5	*As a civil engineer, you need to work hard and love what you are doing to become a successful.*
6	*Be diligent with studies and work hard in order to be able to attain one's desired specialization.*
7	*I need skills to communicate with other people.*
8	*Not all Civil engineers of today are the brightest of their class yet many average students are successful or even more successful because they persevered and fight for their dreams.*

Figure 22. Group Photo of CEORIEN Section EW

The final survey question was "*Do you have any specific recommendations for improving this course*?" Among the responses are shown in Table 10. These recommendation will be considered for Continuous Quality Improvement (CQI).

Table 10. Sample Responses on Recommendations to Improve CEORIEN

Topic	Comments
CE Specs	• *More symposiums, talks from experts* • *More talks from professionals in the field rather than classroom lectures.* • *Have specialized teacher substitute in the field being discussed for one session to really get a feel for that specialization*
Course Activities	• *More hands-on activities* • *More exposure to the students on the practical work of what civil engineers do.* • *More interactive classes, lessen PPT content, focus more on sharing* • *More immersions (field trips) rather than limiting it to a classroom setting* • *Have outside the school activity like doing site visits or tours!*
Final Exam	• *No more final exams* • *The final exam could be replace by a group project*
Schedule	• *Put this course in the 1st term of a CE student*

3.8 Faculty Assessment and Continuous Quality Improvement (CQI)

The CEORIEN teachers were asked to give recommendations on how to improve the course as part of the CQI principles in OBE [4] as shown in Table 11.

Table 11. Faculty Recommendations for CQI

Area of Concern	Recommendations
PowerPoint Slides	*The PowerPoint slides must be improved and more content must be added. There should be notes to guide the reader on the content for each slide. Add more student-centered learning activities in the lectures.*
Online Videos	*Complement the lectures and PPT lectures with short but relevant videos. Engage the students by discussing the relevance of the video to the topic.*
CE Specs 1st Hour (Lecture)	*In the 1st hour SPECS lecture, invite CE Faculty or civil engineer specialists in that field to deliver the lecture. Another option is to hold one hour session for each spec for all sessions by scheduling a common time or schedule, if possible.*
CE Specs 2nd Hour (Activity)	*For each specialization, reserve one enriching activity like a lab experiment or field exercise. This will attract the students to other specializations as they continue to "shop" around for what is really their interest or what can arouse their curiosity especially in the selection of the specialization. Some suggestions on the activity are TRE (survey or software demo like EMME or DYNAMEQ), STE (Deflection experiment, bridge or tower building or software demo like GRASP), CTM (Actual or virtual site visit in a construction site), HWR (actual or virtual lab activity or site visit) and GTE (Soil test demo or virtual experiment)*
ProCESS	*To increase the interest and engagement of the students to the symposium and make them submit reflection papers, the attendance and reflection paper should be given an incentive points that will be credited to the computation of the general average. This incentive should be announced before the symposium.*
CE Profiles	*Add more minimum guidelines or mechanics like (a) Provide students the interview questions that they will ask so that they could compare the responses and advices of the invited professionals, (b) Require proof of interview (video or audio), (c) Require group photo with the engineer, (d) Written report can be in the form of a magazine article, and (e) Suggested theme for Profiles – Civil Engineers in government (DPWH, Building Official Office, DoTr, DOST, LGU)*

4. Conclusions

The pilot implementation of CEORIEN was presented and was found to be successful with positive feedback from students in the various requirements and activities conducted during the term. There is still room for improvement as suggested by the students and the faculty like holding more hands-on student-centered learning activities like lab demo, site visits and tours, having more talks from experts and inviting specialists to lecture about the specializations during class lectures and improvement and updating of the teaching and learning modules (PPT and videos). CEORIEN is very relevant to the CE students especially that it is offered for freshmen since they will be informed and oriented at the early years of their education about the what the civil engineering profession is all about and how they can contribute in building the quality of life as a civil engineer.

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References

[1] DepEd RA 10533 (2013). Enhanced Basic Education Act of 2013, https://www.officialgazette.gov.ph/2013/09/04/irr-republic-act-no-10533/

[2] CHED CMO-92 (2017). Policies, Standards and Guidelines (PSG) for the Degree of Bachelor of Science in Civil Engineering (BSCE) https://ched.gov.ph/cmo-92-s-2017/

[3] Oreta, A.W.C. and Roxas, C. (2012). “Implementing an Outcomes-Based Framework in the Teaching of Engineering Mechanics (STATICS)., Proc. International Conference on CE Education (ICCEE2012), Nov. 9-10, 2012, De La Salle University, Manila ISSN 2244-3738

[4] Chua, A., Oreta, A. and Seva, R. (2016). “Implementing an Outcomes-Based Quality Assurance Process for Program Level Assessment at DLSU Gokongwei College of Engineering,” Phil. Journal of Engineering Education, Vol. 4 No. 1, Oct. 2016, PP. 14-19, ISSN 0115-3447, Published by Phil. Assoc. of Engineering Schools (PAES)