

Comparative Knowledge Gained from Online and Face-to-Face Learning Modes in Management Courses in Nepal

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Abstract

The paper aimed at examining the perceived difference between knowledge gained from online and face-to-face learning modes as a result of the intensities (viz., high and low) of comparative interaction level and ease of attending the classes, in the context of management courses in Nepal. Based on the survey (complete enumeration) of all management students (n=224) attending the online classes at Nepal Open University from 5th to 25th Jan., 2020, the study applied descriptive statistics and factorial ANOVA using the General Linear Model in analysing data to pursue the research objectives. Nepalese management students' experience with their present online classes in terms of the knowledge gained was found to be equivalent to their previous experience with the face-to-face mode. It also discovered that intensities of the comparative interaction level and comparative ease of attending classes had a significant impact on comparative knowledge gained. The findings should offer instrumental inputs to design effective higher education policies blending the online and face-to-face learning modes.

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1. Introduction and Study Objectives

The Internet and the World Wide Web have rolled out huge improvements to practically all parts of our lives on Earth, ranging from a worldwide economy, individual, and professional networks to numerous sources of data, news, and learning (Pape, 2010). Farinella, Hobbs, and Weeks (2000) asserted that the Internet has made online learning possible, and many researchers and educators are interested in online learning to enhance and improve students' learning results while combating the reduction in resources, especially in higher education. Different terminologies have been used for online learning, which makes it difficult to develop a generic definition. Terms commonly used for online learning include e-learning, Internet learning, arranged learning, tele learning, virtual learning, computer-assisted learning, web-based learning, and distance learning (Anderson, 2008). These terms suggest that the student is a ways off from the tutor or instructor, that the student utilises some type of innovation (generally a computer) to get to the learning materials, that the student utilises innovation to associate with the teacher and with different students, and that some type of help is given to students.

Carliner (1999) defined online learning as educational material that is presented on a computer. Similarly, Khan (1997) defined online instruction as an innovative approach for delivering instruction to a remote audience, using the Web as the medium. Bartley and Golek (2001) viewed online learning as a form of distance learning or distance education, which has long been a part of the American education system, and it has now become the largest sector of learning in recent years all over the world. However, Ritchie and Hoffman (1997) affirmed neither placing information on the Web nor linking to other digital resources on the Web constitutes online instruction. Online instruction happens when students utilise the Web to experience the succession of guidance, to complete the learning exercises, and to accomplish learning results and purposes. Web based learning, in any case, includes something beyond the introduction and conveyance of materials utilising the Web: the student and the learning procedure ought to be the focal point of web-based learning.

According to Allen and Seaman (2011), the number of students taking at least one online course by the Fall 2010 semester surpassed 6.1 million. This is up from 3.94 million in Fall 2007 and 5.6 million in Fall 2009. Further, the survey identified that online learning has become such an integral part of higher education that 65 per cent of the higher education institutions include online learning as a critical part of their long-term strategy.

Even in a Gallup poll conducted on 1,967 faculty members before the COVID-19 pandemic, Lederman (2019) found the 'slow and steady' acceptance of online learning by the university teachers. It is a study conducted before the COVID19 pandemic that has forced the physical classes to be either closed or suspended indefinitely.

Of late, the online mode of learning has emerged as a popular and viable alternative to traditional learning across the world. In Nepal, there are 11 universities and two national health/ medical institutes (Sthapit, 2020). On the annals of Nepalese universities, the online learning system and full-fledged online academic degrees were formally and institutionally launched with the establishment of Nepal Open University (NOU) in 2016 under the Nepal Open University Act, 2016 (2073 Bikram Era). The NOU launched online classes from fiscal year 2017/18 (NOU, 2020). Tribhuvan University also established the Open and Distance Education Centre in 2015 (ODEC, 2020), yet its classes are largely based on distance education rather than on the exclusive online mode.

With the onslaught of novel coronavirus pandemic from the turn of the new millennium, traditional face-to-face classes have been brought to a complete halt, making the online classes as probably the only alternative mode of learning. Hence, a majority of educational institutions around the world opted for running the online classes. The emergent learning environment has however, raised the issue if students have perceived any difference between the levels of knowledge gained from these two modes. In this context, a study by (Platt, Ralie, & Yu, 2014) asserted that comparative knowledge gained is one of the key dimensions to the perceived equivalence of online and face-to-face classes.

Insofar as the comparative level of interaction and comparative ease in the two modes of learning (namely, online and face-to-face modes) are concerned, high and low levels can be the two key types of intensity. The present study is interested in examining the effect of these two types of intensity (high and low intensities) of comparative interaction level and comparative ease (of attending technology-supported online classes) on the knowledge gained from online and face-to-face modes. The issue of comparative knowledge gained from these two modes and effect of intensities of class-taking ease and interaction level has remained extremely under-researched let alone the study of the same in Nepalese context.

Study objectives: Based on the above discussions, the current study aimed at investigating the students' perception of the difference existing between knowledge gained from online and face-to-face learning in the management courses in Nepal. The main aim was followed by the following specific objectives:

- To examine the effect of intensities of comparative level of interaction, intensities of comparative ease of attending classes and their mutually interactive effect on knowledge gained from online and face-to-face modes of learning;
- To identify the existence of differences in comparative knowledge gained across intensities of comparative interaction level and of comparative ease of attending classes; and
- To ascertain if intensities of comparative interaction level are independent of the intensities of comparative ease of attending online classes

2. Literature Review

This section discusses the review of literature concerning the perceived difference between knowledge gained from online and face-to-face learning because of the intensities (viz., high and low) of comparative interaction level and comparative ease of attending the classes.

Dewey (1938) defined learning as a remarkably complex process influenced by a wide variety of factors. There are plenty of theories proposed over the years to help explain how people learn. Bandura (1977) postulated social learning theory, which explains human behaviour in terms of continuous reciprocal interaction between cognitive, behavioural, and environmental influences. The emphasis on creating engaged learners who replicate what they have learned has made social learning theory attractive to educators (Nguyen, 2015). One of the big takeaways from social learning theory is the importance of maintaining engaged students and modelling behaviour for those students through a series of interactions such as teacher-students, students-student and students-teacher during studies.

Comparative knowledge gained: Some of the studies found no significant differences between online and face-to-face classes in terms of knowledge gained (e.g., Clark & Jones, 2001; Hollerbach & Mims, 2007; Johnson, Aragon, Shaik, & Palma-Rivas, 2000; Horspool & Yang, 2010).

Many other empirical studies, however, show variations in comparative knowledge gained from the two modes of learning. In an Italian study of Schettini, Amendola, Borsini, and Galassia (2020) conducted on a university's chemistry students, the online mode was found to result in increased knowledge acquisition evidenced by an 11 percent rise in the students passing the exams, as it reported a positive correlation between the time spent on the online platform and the scores secured by students in the exams. On the similar line, Koory (2003) earlier found that students gained greater knowledge from online classes while the studies of Cryan, Mentzer, and Teclehaimanot (2007) reported better results from face-to-face classes.

The study findings of Platt et al., (2014) posited that the amount of experience with online classes influences student perceptions of knowledge gained. Students with less exposure to online courses perceived the online learning mode as less contributing than the face-to-face one. Nonetheless, Platt et al. (2014) has left it open for future researchers to probe into what else affects the learner perceptions of comparative knowledge gained from the two modes.

Comparative level of interaction: Interaction has long been a defining and critical component of the educational process and context (Anderson, 2003). However, the term used in many ways to describe many different types of exchanges between different actors and objects associated with teaching and learning (Berge, 1999). It is surprisingly hard to locate a reasonable and exact meaning of this multifaceted idea in the education writing.

The compositions of Dewey (1938) alluded to association as the characterising part of the educational procedure that happens when students change the latent data passed to them from another and construct it into knowledge with personal application and value (Dron, 2007).

Shank (1993) viewed the value of another person's perspective, usually gained through interaction, is a key learning component in constructivist learning theories and in inducing mindfulness in learners (Visser, 2000). Similarly, Laurillard (1997) constructed a conversational model of learning in which interaction between students and teachers plays the critical role. A Moroccan study by Bourzgui, Alami, and Diouny (2020) conducted in the area of dental education emphasised the need for promoting interactions in learning and evaluation (tests) on e-learning platforms in order to improve the knowledge delivery and help students achieve their desired outcomes. Hence, there is a long history of study and acknowledgment of the basic role of association in supporting and in any event, characterising education. In this regard, the study attempts to see the effect of level of comparative level of interaction on comparative knowledge gained.

Comparative ease of attending classes with technology: A philosophy of teaching and technology can be defined as a conceptual framework that embodies certain values from which we view the many aspects of education (Zinn, 1990), including the field of e-learning. Dahlberg (2004) opined leaders that e-learning technologies can effectively respond to accelerating global competition, increase the quality of learning experiences (Garrison, Anderson, & Archer, 2001), and emerging e-learning technologies are having extreme, quick, and disruptive changes on education systems (Archer, Garrison, & Anderson, 1999); nowhere is the impact felt more than on the practitioners who teach.

With increasing expansion of learning opportunities, powerful new software provides rapid access to human resources, materials, and information. Appropriately, deployed, less complex technologies could support exploration and help students discover new knowledge (Valdez, et al., 2000). The systems of hard and soft technologies that enable and support online learning are incredibly complex and technically sophisticated (Kearsley, 2000). In this regard, the current study attempts to assess the effect of comparative ease of attending online classes (using technology) on the comparative knowledge gained from online and face-to-face learning.

Concluding remarks and study framework: Based on the above, the level of comparative interaction and comparative ease of attending classes can result in two intensities/types: high and low. That the intensities of perceived comparative interaction level and comparative ease of attending classes being 'high' and 'low' can impact on the comparative knowledge gained from online and face-to-face learning is something yet to be established.

There is a marked research gap, as no previous research work dealing specifically with these issues was found during the present study. Therefore, the burning issues discussed above constitute the main research topic of the present study as exhibited in the conceptual framework (Fig 1).

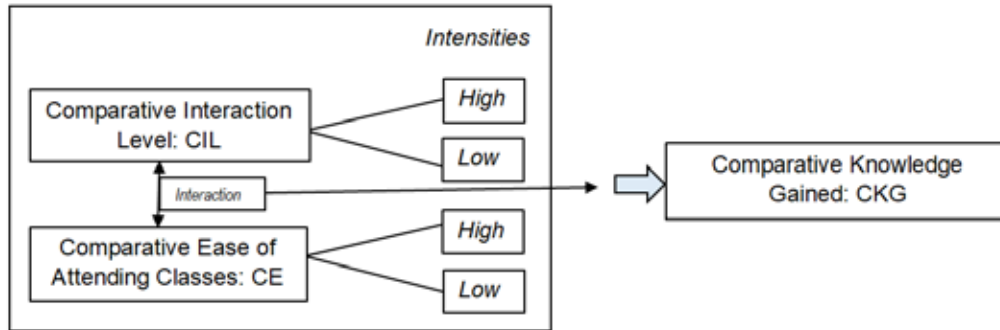


Figure 1: *Conceptual Study Framework*

3. Research Methods

The study adopted descriptive and causal research designs. In view of the nature and scope of the study, the primary data was collected from business course students of Nepal Open University (NOU), the only Nepalese university offering full-fledged online learning system in bachelor and masters' programmes for the last two years in Nepal. The survey covered all the business/ management programmes being offered by the Faculty of Management & Law at the Bachelors and Masters levels. The study has therefore, encompassed the students who have enrolled and undergone online classes at least six months prior to the survey. The need for sampling is irrelevant as the study used a complete enumeration of all business students of NOU.

The questionnaire included a set of closed-ended questions on comparative knowledge gained, interaction and ease previously tested in the study of (Platt, et al., 2014), and was recast and revised in accordance with the research objectives of the present study. Conspicuously, the questionnaire required the respondents to compare their present experience of online classes (learning) with their previous experience with the face-to-face learning which they had had during their previous academic degree. It is obvious that the respondents are in a position to make comparisons between the two modes of learning, as they were engaged in traditional, face-to-face learning mode till the point they have joined their current alma mater Nepal Open University that has exposed them to the online mode.

All items used a Likert-type five-point response scale, ranging from strongly disagree (1) to strongly agree (5). The Microsoft form-based questionnaire was emailed to all the students. The average value of six, ten and five items of the three constructs (viz., comparative knowledge gained, comparative level of interaction and comparative ease) were extracted. Two more categorical variables; namely,

intensities (high and low) of comparative interaction level (LCI_I) and comparative ease (CE_I) were created by computing the variables LCI and CE anew. Each participant was categorised as low LCI if the mean value of that respondent was less than or equal to the overall mean value (2.900) of that construct, and vice versa. Similarly, each respondent was categorised as low CE if the mean value of that participant was less than or equal to overall mean value (2.514) of that construct and vice versa.

The survey— with the prior approval from the programme coordinators— was administered on all 228 business students out of which four outliers were removed from the study in order to maintain normality of the variables under study. With 140 students from the masters' level (62.5 per cent) and 84 from the bachelor levels (37.5 per cent), it posted 224 as the final number of survey respondents under the complete enumeration scheme. The study has applied descriptive statistics and factorial ANOVA using the General Linear Model (GLM) to pursue the research objectives of the study.

Study Limitations

The study covers the students of NOU only. It is, however, justifiable as it is only NOU that exclusively offers online classes; while other university programmes currently follow either a distance learning mode or a blended one; instead of an exclusive online mode. Further, the study has only fulfilled the assumption of normality of the comparative knowledge gained using the one-sample Kolmogorov-Smirnov test.

4. Data Analysis and Discussion

Table 1

Test of Normality of Comparative Knowledge Gained

	Statistic	Comparative Knowledge Gained
N		224
Normal Parameters ^{a,b}	Mean	3.4561
	Std. Deviation	0.90304
	Absolute	0.064
Most Extreme Differences	Positive	0.064
	Negative	-0.063
Kolmogorov-Smirnov Z		0.963
Asymp. Sig. (2-tailed)		0.312

a. Test distribution is Normal. b. Calculated from data.

Note. Calculations based on authors' survey, 2020

In its bid to seek the impact of varying intensities of comparative interaction level and comparative ease of attending classes on knowledge gained from

online and face-to-face learning, the present study first performed the test of the assumption of factorial ANOVA, before analysing data. Accordingly, the one-sample Kolmogorov Smirnov test in *Table 1* established that the outcome variable 'comparative knowledge gained' follows the normal distribution (with z-statistic of 0.963 and significance value of 0.312). It conforms to the required assumption of factorial ANOVA.

As it sought to follow the established rubric, the study thereafter tested the assumption of homogeneity of variance on the outcome variable: 'comparative knowledge gained' across CIL_I and CE_I, by employing Levene's test for equality of variances. The test results in *Table 2* reveal that there exists homogeneity of variance in the unadjusted means of 'comparative knowledge gained' across low and high CIL ($p\text{ value}=0.242$) and across low and high CE ($p\text{ value}=0.174$).

Table 2
Test of Homogeneity of Variance of Comparative Knowledge Gained

Variables		F	Sig.
CIL_I	Equal variances assumed	1.375	0.242
CE_I	Equal variances assumed	1.856	0.174

Note. Calculations based on authors' survey, 2020

Table 3 exhibits the descriptive statistics of all the variables under study. The current study has used the variables of 'comparative interaction level' and 'comparative ease' to form the categorical variables CIL_I (low and high CIL as *intensity types*) and CE_I (low and high CE as *intensity types*); *vis-à-vis* the comparative knowledge gained (CKG), the major variable of interest. The grand average value (3.456) for CKG (with standard error of 0.060) is higher than other variables under study. Thus, it can be interpreted that the NOU learners perceive the knowledge gained from online mode of learning is similar to that from the face-to-face one.

Table 3
Descriptive Statistics of the Variables Under Study

Variables	Mean	Std. Error	SD	Skewness	
				Statistic	Std. Error
Comparative Knowledge Gained: CKG	3.456	0.060	0.903	0.003	0.163
Comparative Level of Interaction: CIL	2.900	0.052	0.779	0.111	0.163
Comparative Ease: CE	2.514	0.049	0.732	0.354	0.163

Note. Calculations based on authors' survey, 2020

Table 4 exhibits the principal effect of intensities of comparative interaction level (CIL_I) and comparative ease (CE_I), and their interaction effect of CIL_I * CE_I on the comparative knowledge gained. The principal effect of intensity of

comparative interaction level (CIL_I) was found as statistically significant with F value of 278.733 (p value=0.001) and effect size of 55.9 per cent on the total variability of CKG.

Similarly, the principal effect of intensities of comparative ease (CE_I) is also significant with F value of 57.673 (p value= 0.001) and effect size of 20.8 per cent on the total variability of comparative knowledge gained. Subsequently, the interaction effect of CIL_I and CE_I also has posted a statistically significant effect on comparative knowledge gained (CKG) with F value of 5.863 (p value of 0.016). However, its effect size is very small (0.026) despite having a statistical significance thereon.

Table 4
Tests of 'between-subject' effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	134.54a	3	44.847	208.536	0.001	0.740
Intercept	2092.82	1	2092.822	9731.502	0.001	0.978
CIL_I	59.94	1	59.943	278.733	0.001	0.559
CE_I	12.40	1	12.403	57.673	0.001	0.208
CIL_I * CE_I	1.26	1	1.261	5.863	0.016	0.026
Error	47.31	220	0.215			
Total	2857.48	224				
Corrected Total	181.85	223				

Dependent Variable: Comparative Knowledge Gained

a R Squared = .740 (Adjusted R Squared = .736)

The tests have been based on the comparisons between the subjects or categorised groups, i.e., intensities (low and high) of CIL and CE.

Note: Calculations based on authors' survey, 2020T

able 5 presents the adjusted or unweighted average values of comparative knowledge gained (CKG) across the high-low intensities of comparative level of interaction (CIL_I) and comparative ease (CE_I). The average values of CKG (comparative knowledge gained) for the students perceiving high CIL and high CE in online classes at NOU are 4.128 and 3.802, respectively; they are both higher than those students perceiving low CIL and low CE (2.933 and 3.269 respectively). The result indicates that the higher level of interaction and comparative ease in attending the online classes leads to more knowledge gained from such virtual classes than traditional face-to-face classes. Appendix 1 exhibits the weighted average values i.e. mean values of CKG assuming the equal sample sizes under each intensities of CLI and CE are however, different from the average values in table 5, i.e., for low CIL $2.933 \neq 2.748$, for high CIL $4.128 \neq 4.217$, for low CE $3.259 \neq 2.905$ and for high CE $3.802 \neq 4.048$.

Table 5
Estimated Marginal Means of Comparative Knowledge Gained

Category	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Low CIL	2.933	0.050	2.834	3.032
High CIL	4.128	0.051	4.028	4.228
Low CE	3.259	0.050	3.160	3.358
High CE	3.802	0.051	3.702	3.903

Note. Calculations based on authors' survey, 2020

For the robust check, the study performed the pairwise comparison to determine if there exists significant difference in the comparative knowledge gained (CKG) across the intensities of comparative interaction level and ease (CIL_I and CE_I). The table 6 shows that the mean differences in comparative knowledge gained for the NOU students across CIL_I (1.195) and CE_I (0.544) are significantly different from zero at 0.001 level of significance.

Table 6
Test of Mean Difference Across CIL_I and CE_I of Comparative Knowledge Gained

Category (I)	Category (J)	Mean Difference (I-J)	Std. Error	Sig.b
High CIL	Low CIL	1.195*	0.072	0.001
High CE	Low CE	.544*	0.072	0.001

Based on estimated marginal means

* The mean difference is significant at the .05 level.

^b Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Note. Calculations based on authors' survey, 2020

Further, in order of confirming the interaction effect of intensities of comparative interaction level and comparative ease (i.e., CIL_I * CE_I) on the comparative knowledge gained (CKG), the study performed a pairwise mean difference test across the intensity types of comparative interaction level (CIL_I) within those of comparative ease (CE_I). Table 7 reveals that both within the low- and high-level CE, there exists a significant effect of interaction level across the low and high CIL's with statistically significant different values of 1.368 and 1.022 respectively, both at 0.001. The mean values of the low and high CIL's within the CE_I (intensities of comparative ease of attending classes) are presented in Appendix 2.

Key results and discussion: The current study aimed at investigating the students' perception of equivalence between online and face-to-face courses on the dimension of comparative knowledge gained and to analyse the effect of intensities of comparative interaction level, comparative easiness of attending classes, and their mutually interactive effect (CIL_I * CE_I) — all on comparative

knowledge gained by the respondents. The study has discovered that the students' experience with the online classes in terms of comparative knowledge gained is equivalent to that with the face-to-face classes (with the aggregate mean values figuring 3.45, out of five). It contradicted with the study of Horspool and Yang (2010), which reported students perceived gaining greater knowledge from face-to-face courses. The result from the present study has also differed with that of Platt et al. (2014), in which students did not perceive online and face-to-face classes to be equivalent. That the NOU's Nepalese students perceived the online and face-to-face classes as equivalent in terms of gaining knowledge can be attributed to the fact that they are mentally prepared to pursue the online mode of learning when joining the NOU.

Table 7

Test of Mean Difference Across CIL_I within CE_I of Comparative Knowledge Gained

CE_I	(I) CIL_I	(J) CIL_I	Mean Difference (I-J)	Std. Error	Sig.b
Low CE	High CIL	Low CIL	1.368*	0.101	0.001
High CE	High CIL	Low CIL	1.022*	0.102	0.001

Based on estimated marginal means.

* *The mean difference is significant at the .05 level.*

b Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Note. Calculations based on authors' survey, 2020

Platt et al. (2014); Bee and Usip (1998); Burns (2013) and Tallent-Runnels et al. (2006) found that students' longer experience with and exposure to online classes made a positive impact on comparative knowledge gained and comparative interaction level. Bourzgui et al. (2020) also emphasised on the higher level of interaction in the eLearning system (on both online and blended modes). As reported by these studies, the present study also found that the intensities of the comparative interaction level had the significant effect on comparative knowledge gained (with the effect size of 55.9 per cent). The result should prove to be obvious as the NOU's online learning mode exclusively features synchronous or real-time classes (on Microsoft Teams, previously Skype for Business) that provide its learners plenty of opportunities to interact with the teacher and fellow learners. NOU also integrates its synchronous mode with an asynchronous one where pre-recorded ready-to-use learning materials are also uploaded on the Moodle-based Learning Management System or LMS (NOU, 2020).

Further, the study has found that the intensities of comparative easiness of attending online classes also have a significant impact on comparative knowledge gained (with the effect size of 20.8 per cent). Finally, the study has discovered dependency between intensities of comparative interaction level and comparative ease of technology adaptation in attending classes (at least within the intensity frames of comparative ease: CE_I).

5. Conclusion and Implications

The present study examined the perceived difference between knowledge gained from online and face-to-face learning modes because of the varying intensities (viz., high and low) of comparative interaction level and comparative ease of attending the tech-aided online classes. As it has investigated the issue in the context of Nepalese students doing their management courses, it has concluded that the students' experience with both the online and face-to-face classes in terms of comparative knowledge gained is equivalent. Education leaders and policy makers, therefore, need to have no qualm over promoting the online mode of learning vis-à-vis the conventional face-to-face one insofar as the aim of knowledge acquisition is put in perspective.

However, comparative knowledge gained by the students from online and face-to-face classes is significantly impacted by the intensities of comparative interactions with their course instructors. Therefore, interactions in online classes— if made effective— can help students enhance their knowledge acquisition in the subject matter; the result has, thus, come in line with the social learning theory, which advocates that effectiveness of courses depends on interaction between students and instructors. Since learning takes place in the social setting, online classes also create an aura of a mini-society; consequently, students can gain more knowledge through the increased levels of interaction with the teachers during the online sessions.

Similarly, how much knowledge students gain from the two modes of learning is also significantly influenced by the intensities of comparative easiness of attending the 'technology-enabled' virtual classes vis-à-vis physical classes. Promoting students' access to required technologies and removing potential technical glitches can make it easier for them to gain more knowledge also from virtual classes. Going by the student perception on all the accounts studied in this paper, comparative knowledge gained from the face-to-face and online classes is 'virtually' the same.

References

- Allen, E., & Seaman, J. (2011). *Going the distance: Online education in the United States*. Babson Survey Research Group. Retrieved from <http://www.onlinelearningsurvey.com/reports/goingthedistance.pdf>
- Anderson, T. (2003). Getting the mix right: An updated and theoretical rationale for interaction. *International Review of Research in Open and Distance Learning*, 4(2). doi:10.19173/irrodl.v4i2.149
- Anderson, T. (Ed.). (2008). *The theory and practice of online learning*. Edmonton, AB: AU Press. Retrieved March 12, 2020, from http://biblioteca.ucv.cl/site/colecciones/manuales_u/99Z_Anderson_2008Theory_and_Practice_of_Online_Learning.pdf%20
- Archer, W., Garrison, R., & Anderson, T. (1999). Adopting disruptive technologies in traditional universities: Continuing education as an incubator for innovation. *Canadian Journal of University Continuing Education*, 25(1), 3-30.

- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bartley, S. J., & Golek, J. H. (2001). Evaluating the cost effectiveness of online and face-to-face instruction. *Educational Technology & Society*, 7(4), 167-175.
- Bee, R. H., & Usip, E. E. (1998). Differing attitudes of economics students about Web-based instruction. *College Student Journal*, 32(2), 258-269.
- Berge, Z. L. (1999). Interaction in post secondary web based learning. *Educational Technology*, 39(1), 5-11.
- Bourzgui, F., Alami, S., & Diouny, S. (2020). A comparative study of online and face-to-face learning in dental education. *EC Dental Science*, 19(3), 1-11. Retrieved from <https://www.researchgate.net/publication/339948717>
- Burns, B. (2013). Students' perceptions of online courses in a graduate adolescence education program. *MERLOT Journal of Online Learning and Teaching*, 9(1), 13-25. Retrieved from http://jolt.merlot.org/vol9no1/burns_0313.htm
- Carliner, S. (1999). *Overview of online Learning*. Amherst, MA: Human Resource Development Press.
- Clark, R. A., & Jones, D. (2001). A comparison of traditional and online formats in a public speaking course. *Communication Education*, 50, 109-124. doi:10.1080/03634520109379238
- Cryan, J. R., Mentzer, G., & Teclehaimanot, B. (2007). Two peas in a pod? A comparison of face-to-face and web-based classrooms. *Journal of Technology and Teacher Education*, 15, 233-246. Retrieved from <https://www.learntechlib.org/primary/p/19863/>
- Dahlberg, L. (2004). Internet research tracings: Towards non-reductionist methodology. *Journal of Computer Mediated Communication*, 7(1). doi:10.1111/j.1083-6101.2004.tb00289.x
- Dewey, J. (1938). *Experience and education*. New York: Macmillan.
- Dron, J. (2007). *Control and Constraint in e-learning: Choosing When to Choose*. Hershey, PA: Information Science Hub.
- Farinella, J. A., Hobbs, B. K., & Weeks, H. S. (2000). Distance delivery: The faculty perspective. *Financial Practice and Education*, 10, 184-194.
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence and computer conferencing in distance education. *American Journal of Distance Education*, 15(1), 7-23.
- Green, S. B. (1991). How many samples does it take to do a regression analysis? *Multivariate Behavioral Research*, 26(3), 499-510.
- Hollerbach, K., & Mims, B. (2007). Choosing wisely: A comparison of online, televised, and face-to-face instructional methods on knowledge acquisition of broadcast audience concepts. *Journalism and Mass Communication Educator*, 62, 176-189. doi:10.1177/107769580706200205
- Horspool, A., & Yang, S. S. (2010). A comparison of university student perceptions and success learning music online and face-to-face. *MERLOT Journal of Online Learning and Teaching*, 6, 15-29. Retrieved from http://jolt.merlot.org/vol6no1/horspool_0310.pdf

- Johnson, S. D., Aragon, S. R., Shaik, N., & Palma-Rivas, N. (2000). Comparative analysis of learner satisfaction and learning outcomes in online and face-to-face learning environments. *Journal of Interactive Learning Research*, 11, 29-49. Retrieved from <http://editlib.org/p/8371>
- Kearsley, G. (2000). *Online education: Learning and teaching in cyberspace*. Stamford, CT: Wadsworth.
- Khan, B. (1997). Web base instruction: What is it and why is it? In B. H. Khan, *Web based instruction* (pp. 5-18). Englewood Cliffs, NJ: Educational Technology Publications.
- Koory, M. A. (2003). Differences in learning outcomes for the online and F2F versions of "An introduction to Shakespeare. *Journal of Asynchronous Learning Networks*, 7(2), 18-35.
- Laurillard, D. (1997). *Rethinking university teaching: A framework for the effective use of educational technology*. London: Routledge.
- Lederman, D. (2019, October). *Insidehighered*. Retrieved from https://www.insidehighered.com/news/survey/professors-slow-steady-acceptance-online-learning-survey?mc_cid=2945ba851e&mc_eid=e50f233812
- Nguyen, T. (2015). The effectiveness of online learning: Beyond no significant difference and future horizons. *MERLOT Journal of Online Learning and Teaching*, 11(2), 309-319.
- NOU. (2020). *About Nepal Open University*. Retrieved from Nepal Open University Official Website: <https://nou.edu.np/about-nou>
- ODEC. (2020). *About ODEC Tribhuvan University*. Retrieved from ODEC Official Website: <http://www.odectu.edu.np/index.php>
- Pape, L. (2010). Blended teaching and learning. *School Administrator*, 67(4), 16-21.
- Platt, C. A., Ralie, A. N., & Yu, N. (2014). Virtually the same?: Student perceptions of the equivalence of online classes to face to face classes. *MERLOT Journal of Online Learning and Teaching*, 10(3), 489-503. Retrieved from https://jolt.merlot.org/vol10no3/Platt_0914.pdf
- Ritchie, D. C., & Hoffman, B. (1997). *Incorporating instructional design principles with the world wide web*. Englewood Cliffs, NJ: Educational Technology Publications.
- Schettini, C., Amendola, D., Borsini, I., & Galassia, R. (2020). A blended learning approach for general chemistry modules using a Moodle platform for first year academic students. *Journal of E-Learning and Knowledge Society*, 16(2), 61-72. doi:<https://10.20368/1971-8829/1135197>
- Shank, G. (1993). The semiotic dynamics of navigating the net. *The Arachnet Electronic Journal on Virtual Culture*, 1(1), 1-13.
- Sthapit, A. (2020). *International business: Environments and strategies*. Kathmandu: Taleju Prakashan.
- Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., & Shaw, S. M. (2006). Teaching courses online: A review of the research. *Review of Educational Research*, 76(1), 93-135. doi:10.3102/00346543076001093
- Valdez, G., McNabb, M., Foertsch, M., Anderson, M., Hawkes, M., & Raack, L. (2000). *Computer based technology and learning: Evolving uses and expectations*. North Central Regional Educational Laboratory. Retrieved from <http://www.ncrel.org/tplan/cbtl/toc.htm>

Visser, J. (2000). Faculty work in developing and teaching web-based distance courses: A case study of time and effort. *American Journal of Distance Education*, 14(3), 21-32.

Zinn, L. M. (1990). Identifying your philosophical orientation. In M. Galbraith, *Adult Learning Methods* (pp. 39-77). Malabar, FL: Krieger.

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Appendix 1

Weighted descriptive statistics across CIL_I and CE_I for comparative knowledge gained

CIL_L	CE_L	Mean	STD	N
Low CIL	Low CE	2.575	0.496	88
	High CE	3.291	0.215	28
	Total	2.748	0.540	116
High CIL	Low CE	3.943	0.288	28
	High CE	4.313	0.533	80
	Total	4.217	0.507	108
Total	Low CE	2.905	0.743	116
	High CE	4.048	0.651	108
	Total	3.456	0.903	224

Appendix 2

Weighted descriptive statistics across CIL_I within low CE and high CE

CIL_I	CE_I	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Low CE	Low CIL	2.575	0.049	2.477	2.672
	High CIL	3.943	0.088	3.770	4.116
High CE	Low CIL	3.291	0.088	3.119	3.464
	High CIL	4.313	0.052	4.211	4.415