

# Matching Learning Activities with Mode of Delivery: Developing Robust Hybrid Instruction Using Nicenet<sup>1</sup>

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**Abstract**— The extended debate over the effectiveness of online versus face-to-face classroom instruction reaches a consensus and found combining face-to-face and online strategy (hybrid) is preferable than opting for either mode alone. As a result, hybrid instruction has gained popularity, as it combines the strengths of face-to-face and online instruction. However, our current understanding of this mode of delivery is still in its infancy despite the ubiquity of hybrid instruction in the realm of higher education. For instance, finding what learning activities are best conducted face-to-face and what learning activities flourish online remains largely unexplored in the EFL (English as a Foreign Language) classroom. To appropriately match learning activities and mode of delivery, two different types of hybrid methods were developed using Nicenet for teaching the unit English Grammar. Participants were divided into two cohorts. The first group attended hybrid type 1 during the first three sessions and attended hybrid type 2 the following three sessions. The second group did the reverse. Such a design enabled all participants to experience both models of hybrid instruction. At the end of the study, participants were required to fill in a questionnaire designed to gauge their perceptions on the suitability of the learning activities relative to the mode of delivery. Follow up interviews were also conducted with a number of sample participants. It was found that lectures and presentation of group discussion are best conducted face-to-face, whereas group discussion, quizzes, and assignment submissions are better conducted online. Online and face-to-face consultations with the lecturer can be equally viable.

**Keywords**— blended learning, face-to-face instruction, hybrid instruction, online learning.

## I. INTRODUCTION

The past decade has seen proliferation of online learning programs across the globe [1]–[3], especially as far as higher education is concerned. However, research studies examining the merit of this new delivery mode have yielded conflicting findings [4], which, in turn, incite extended debates pertaining to its merit when compared to conventional classroom instruction [1].

In an attempt to reconcile the heated debate, a number of scholars have recommended a ‘hybrid’ approach or ‘blended’ learning [5]–[7], simply because this mode of delivery is believed to combine the strength of online and face-to-face

instruction [8]. However, this should not be taken for granted because hybrid instruction could also combine the weakness, rather than the strength of face-to-face and online [9]. Hybrid instruction can only combine the strength of both modes if, and only if, the learning activities appropriately match the mode of delivery.

Needless to say, certain learning activities may be more appropriately conducted face-to-face, but others may flourish online [1]. The challenge is, therefore, to identify what learning activities are best conducted online and what learning activities are more appropriately conducted face-to-face. However, despite the omnipresence of hybrid learning in higher education today, little research has examined this very important issue [6], [7], [10], [11]. We argue that only by understanding the appropriate match between learning activities and mode of delivery can robust hybrid instruction combining the strength of both face-to-face and online be developed.

## II. LITERATURE REVIEW

This section comprises three parts. The first part provides a brief introduction to online learning along with critics and debates surrounding this mode of delivery, followed immediately by discussion on hybrid learning as an alternative to online learning. In this case, gaps in research will be critically examined and discussed to provide a context for the study reported here. Finally, two media theories governing the choice of media relative to learning tasks will also be discussed in light of face-to-face and computer-mediated communication.

### A. Online Learning

The past decade has witnessed an almost exponential increase in the number of online learning programs in higher education [1] utilizing Learning Management System such as WebCT/Blackboard, Nicenet, and Moodle, to name a few. However, online learning is reported to have high dropout rates compared to conventional classroom instruction [12], [13]. For example, a study conducted in the USA in 2002 suggests that only less than 5% of the students enrolled in online courses would actually complete their studies [14]. High dropout rates are mainly attributed to the feeling of alienation and isolation [12], [15]–[18], owing to the absence of dynamic interaction between the students and the teacher and among the students. However, with the advent of Web 2.0

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and VoIP technology, which enables dynamic interaction, these feelings of alienation and isolation should be minimised.

Nonetheless, it is important to bear in mind that students may have different personal characteristics and this difference could impact on how they actually learn. For example, while some students are self-regulated in their learning [19], others are dependent on their teacher. For those who rely heavily on their teacher, the absence of face-to-face meetings with the teacher could be detrimental to their learning. Since online learning requires independence and responsibility on the part of the students, it may be more appropriate for self-regulated learners, but may prove to be more exigent for non self-regulated learners [20], [21]. Simply put, although an online strategy may be suitable for some students, it is clear that it may not be for everyone. A combination of both online and face-to-face (i.e., hybrid), as mentioned previously, have been recommended [8].

### *B. Hybrid Learning*

The term 'hybrid' learning has been used synonymously with 'blended' learning in the literature [6], [7] to refer to a mixture of online and face to-face strategies to deliver course content, including learning activities. Typically, hybrid mode of delivery has an online component of 30-79% [22].

The impetus for hybrid learning is the assumption that it actually combines the strengths of online and face-to-face classroom [8], [22], [23]. However, to be able to combine the strengths of both modes, and to avoid combining the weaknesses, we need to first of all identify what learning activities are more appropriately conducted online and what activities thrive in a face-to-face classroom. Without this knowledge in mind, it is very difficult, if not impossible, to develop robust hybrid instruction, for it is likely that we end up combining the weaknesses of online and in-class instruction [9], [24]. Unfortunately, limited research on this particular issue is readily available [6], [7], [11].

Additionally, whereas hybrid mode of delivery has always been referred to as 'the best of both worlds' [8], research studies have yielded contradictory results with studies comparing online and face-to-face classroom instruction. For example, whilst some studies attest to the pre-eminence of hybrid instruction over face-to-face and online formats [8], other studies suggest that face-to-face mode of delivery is more preferable [24], [25]. However, there are also studies reporting that these three different modes are equally effective [26]. Given these conflicting findings, research on hybrid instruction is by no means conclusive.

Inconsistencies in findings across studies examining the effectiveness of hybrid instruction may be attributed to a number of factors. To begin with, there are variations in the percentage of online and face-to-face instruction employed in each of these studies [20]. An immediate question that comes to mind is that would a hybrid of 50:50 (fifty percent face-to-face and fifty percent online) be as effective as that of 30:70? Instinct tells us that there should be differences in one method to another. Thus, an issue of significance, as far as hybrid instruction is concerned, is related to the ideal percentage of online and in-class instruction, as different proportion of online/face-to-face teaching may result in different learning outcomes.

Another factor concerns differences in the types of delivery mode chosen to support learning activities. For example, while some studies use face-to-face for lectures, assignment, and examinations [27], other studies use an online strategy. It is not surprising that conflicting findings have been sporadically reported in these studies. Research examining the effectiveness of hybrid instruction should, therefore, focus on identifying which learning activities are best conducted face-to-face and which activities flourish online [6], [7], [11], [20]. To better understand this issue, two influential media theories will be discussed immediately below.

### *C. Media Theory*

Two media theories are relevant for the discussion of online, face-to-face and hybrid instruction – Media Richness Theory and Media Synchronicity Theory. To begin with, Media Richness Theory (hereafter MRT) assumes that each medium has a different degree of richness in that, there are media which are [+ rich], but there also media which are [– rich] [28], [29]. Rich media are capable of providing different communication channels [30]. With this definition, face-to-face communication is classified as [+ rich] media because it enables various communication channels such as use of body language, eye contact, tone, facial expression, etc. On the other hand, text-based communication (such as e-mail and bulletin board) using computer is regarded as [– rich] media due to the limited communication channels provided by such media [29].

Whereas MRT postulates that media can be classified as [+ rich] and [– rich], the theory emphasizes that [+ rich] media are not necessarily more effective than [– rich] media. Instead, it postulates that media effectiveness is defined by the appropriate match between communication activities with communication media employed [29]. Thus, certain communication media are more effective for certain communication tasks than others. In this case, MRT distinguishes two different communication tasks: task of uncertainty and task of equivocality [28]–[30].

Uncertainty occurs when there is insufficient information for the communication tasks, whereas equivocality occurs when information on the communication task is available, but such information is ambiguous and open to multiple interpretations. Thus, whereas uncertain tasks require more information, equivocal communication tasks require negotiations to reach consensus among participants involved in the communication [31].

MRT postulates that when the communication task is equivocal in nature (discussion is required to reach consensus), [+ rich] media such as face-to-face communication is considered to be more effective communication media. However, when the information is unequivocal in nature (i.e., more information is required), [– rich] media is considered to be more effective [28]. Thus, as far as MRT is concerned, no single media is appropriate for all communication tasks.

In the context of teaching and learning, uncertainty occurs when students do not have sufficient information on course materials. In this case, according to MRT, to deliver course materials, use of [– rich] media, such as computer-mediated communication, is considered to be more effective. However, when there is ambiguity in the information, and further discussion is needed, MRT predicts that [+ rich] media

is most appropriate for such a task [28], [29]. In a nutshell, MRT argues that [- rich] and [+ rich] media have strengths and weaknesses and their effectiveness depends very much on the communication tasks.

Secondly, Media Synchronicity Theory (hereafter MST) is an extension of MRT. Whereas MRT hypothesizes that the effectiveness of communication media is defined by the appropriate match between *characteristics* of the communication tasks and the characteristics of the communication media [29], MST assumes that media effectiveness is defined by appropriate match between communication *process* and the capability of the media. In this case, MST distinguishes between two types of communication process referred to as ‘conveyance’ – exchange of information followed by elaboration of its meaning – and ‘convergence’ – the reach of a shared meaning among participants involved in the communication [31], [32].

According to MST, media capability determines the effectiveness of such media based on the two communication processes divided further into five dimensions referred to as ‘immediacy of feedback’ (media capability to enable immediate response by the interlocutor), ‘symbol variety’ (media capability to provide various communication channels), ‘parallelism’ (media capability to enable simultaneous communication), ‘reversibility’ (media capability to enable users to edit, revise, or change messages before being delivered to others), and ‘reprocess ability’ (media capability to enable user to review conversation that has taken place [32]. Capability of face-to-face and computer-mediated communication, based on the above dimensions, can be presented in the following table:

Table 1. Face-to-face and Computer-Mediated Communication According to Dimensions of MST

Dimensions	Face-to-Face	CMC
Immediacy of feedback	+	±
Symbol variety	+	±
Parallelism	-	+
Reversibility	-	+
Processability	-	+

Thus, according to MST, no single media is superior on all five dimensions mentioned above. In other words, face-to-face communication may be more effective than CMC for certain communication processes and the reverse may also be true.

### III. METHOD

In this section, research method will be discussed. This includes research question, subject of the study, instrumentation, research procedure, data collection, and data analysis.

#### A. Research Question

The question guiding the study was: What learning activities (i.e. lectures, discussion, groupwork presentation, quizzes, assignment submission, consultations with the lecturer) are best conducted face-to-face and what learning activities are more appropriately conducted online?

#### B. Subjects

Forty-five students, 10 males and 35 females, of the English department at Halu Oleo University participated in this study. Enrolled in the academic years of 2013/2014, these students were aged 20 – 22 years old. These participants were recruited using a purposive sampling technique. The choice of the participants, which belonged to an intact group, was based on the consideration that all took the unit ‘English Grammar’ – the subject which became the focus of the present study.

#### C. Instrumentation

A brief questionnaire was developed to capture student perceptions of the modes of delivery (face-to-face and online) relative to the learning activities (lectures, group discussion, presentation of group work, quizzes, assignment submission, and consultation with the lecturer). Additionally, in-depth interview technique was also used to further explore their learning experience regarding the preferred type of delivery mode relative to the learning activities. Use of both questionnaires and interviews is expected to provide a more comprehensive picture of student learning experience, thus providing critical information concerning robust hybrid design from the standpoint of the participants.

#### D. Procedure

Participants were divided into two cohorts. Each group attended both types of hybrid instruction over the course of six sessions as shown in the following table:

Table 2. Group versus Hybrid Type

Group 1	Hybrid Type	Group 2	Hybrid Type
Session 1	Type #1	Session 1	Type #2
Session 2	Type #1	Session 2	Type #2
Session 3	Type #1	Session 3	Type #2
Session 4	Type #2	Session 4	Type #1
Session 5	Type #2	Session 5	Type #1
Session 6	Type #2	Session 6	Type #1

Course materials, assignment, and quizzes for both groups were identical. Short training on how to use Nicenet was provided to those who felt they needed training to properly function in this new learning environment. Details of the learning activities in both formats of hybrid instruction are presented in the following table.

Table 3. Learning Activities in Two Different Hybrid Formats

Types of Learning Activities	Types of Hybrid	
	Hybrid #1	Hybrid #2
Lectures	Face-to-face	Online
Group Discussion	Online	Face-to-face
Presentation of Groupwork	Face-to-face	Online
Quizzes	Online	Face-to-face
Assignment Submission	Face-to-face	Online
Consultation with the lecturer	Online	Face-to-face

#### E. Data Collection

The data in the present study derived from two different, but interrelated, sources: questionnaires and results of the interview. Questionnaires were administered at the end of the

study, followed immediately by interviews with a number of sample participants to examine the perceived effectiveness of the learning activities relative to the mode of delivery (face-to-face and online). This would enable identification of the learning activities that are more appropriately conducted online and those that are best conducted face-to-face from the standpoint of the participants.

#### F. Data Analysis

Data obtained from the questionnaires were analyzed using frequency analysis, where participant's responses to Likert-Scale questionnaire items were calculated to examine their degree of preference for certain learning activities relative to the mode of delivery. This would enable a better understanding of the learning activities that are best conducted online and those that are more appropriately conducted in a conventional face-to-face classroom. Data obtained from interviews were analyzed qualitatively to enrich data obtained through questionnaires. In this case, students' responses to a particular question were thematically grouped (either in favour of or against a particular statement; for example, whether or not they consider online lectures more effective than face-to-face lectures). All comments belonging to the same category were grouped together and possible links among themes were discussed when relevant.

#### IV. RESULTS

As stated earlier, the main objective of the present study was to examine students' perceptions of different types of learning activities relative to the mode of delivery by specifically examining what activities are best conducted in a conventional face-to-face classroom and what activities are more effectively conducted online using Nicenet. Six learning activities were introduced for the purpose of the present study: lectures, group discussion, presentation of groupwork, quizzes, assignments submission, and consultation with the lecturer. In the following section, student responses to each item of the questionnaires will be presented so that the viability of each learning activity relative to the mode of delivery can be demonstrated.

*Table 4. Students' Responses on the Questionnaire Items*

No. Questions	Student Responses (frequency)				
	1 (SD)	2 (D)	3 (NS)	4 (A)	5 (SA)
1. I prefer attending face-to-face to online lectures	0	2	2	20	21
2. If given an option, I would prefer participating in online discussion to face-to-face discussion	1	2	0	13	29
3. In my opinion, face-to-face presentation of groupwork is inferior to online presentation	17	28	0	0	0
4. I would prefer online quizzes to paper-based quizzes completed in the classroom	0	0	0	5	40
5. Submitting assignment online is more effective and efficient than submitting assignment in a face-to-face classroom	0	0	1	2	42
6. Consultation with the lecturer is easier conducted online than F2F	0	15	5	20	5

As seen from the above table, the majority of the participants (91.12%) favor face-to-face lectures. In fact, only a handful of participants (4.44%) do not share this view and another 4.44% are indecisive. Thus, it appears that, as far as hybrid instruction is concerned, the lecture component might be best conducted face-to-face. However, it is worth noting that this strong preference for face-to-face lecture may simply be attributable to the fact that online lecture is purely text-based. Different results may have been obtained had online lecture made use of video. In fact, there is evidence that conventional lecture and digital lecture using video are equally favored by the students [2].

Similarly, face-to-face is also more preferable than online mode of delivery for such a learning activity as 'presentation of the results of groupwork'. In fact, more than 60% of the participants expressed their agreement with use of face-to-face strategy for 'presentation of the results of groupwork' and almost 40% express their agreement quite strongly. None of the participants expresses their disagreement. This further confirms the conclusion that 'presentation of the results of groupwork' is more appropriately conducted in a face-to-face classroom.

In comparison, online mode of delivery appears to be more desirable for such learning activities as group discussion, quizzes and assignment submission. To begin with, the majority of the participants (93.33%) believe that group discussion is more preferably conducted online. Only a small number of participants (6.67%) are of different opinions. As for quizzes, all participants (100%) express their preference for online quizzes, 88.89% of which express their preference quite strongly. As far as assignment submission is concerned, the majority of the participants (97.78%) indicate that they prefer to submit their assignment online. Only one participant (2.22%) is unable to make up his mind.

Interestingly, when it comes to consultations with the lecturer, the number of participants who opt for online and face-to-face consultations is almost equal. Around 55.56% of the participants express their preference for online consultations, whilst another 44.44% prefer face-to-face consultations. This suggests that both modes of delivery appear to be feasible for this particular type of activity.

In addition to the data gathered through questionnaires, a number of sample participants were also interviewed regarding their experience doing different learning activities online and face-to-face. Some of the participants' responses to the six questions asked will be presented below, followed immediately by commentaries on these responses.

**Question #1.** In your opinion, how effective are online lectures? What are the advantages and disadvantages? If given an option, which one would you prefer to attend, online or face-to-face lectures? Why?

Below are some of the responses<sup>2</sup> of the participants to the above questions:

<sup>2</sup> Notice the grammar of these responses has been edited for clarity without changing their original meanings.

In my opinion, online lectures are good because we do not have to come to the classroom to attend classes. However, if there are things (course materials), which are not clear (which we do not understand), we cannot ask the lecturer questions directly. If we post questions to the chat rooms, sometimes the lecturer is not online and we have to wait accordingly. Therefore, I would prefer to attend face-to-face lectures (#M)

During online lectures, the lecturer does not supervise the class directly and, at times, there are students who are not very serious attending the lectures. Additionally, although course materials are readily available online, it is much better if these materials are explained by the lecturer. So, if given an option, I would opt for face-to-face lectures taught directly by the teacher (#L)

One of the most commonly reported grounds for opting for face-to-face over online lectures by the participants is that face-to-face lecturers enable them to receive immediate feedback from the teacher. With online lectures, however, there is a delay in getting such feedback. In other words, teacher immediacy [33], [34] is amongst the important factors that make face-to-face lecturers more desirable.

Another factor is related to the perceived lack of supervision by the teacher during online lectures. As a result, participants expressed their preference for face-to-face over online lectures. Interestingly, their responses change when it comes to online discussion as discussed below.

**Question #2.** In your opinion, how effective is online discussion? What are the advantages and disadvantages? If given an option, which one would you prefer, online or face-to-face discussion? Why?

Personally, I think I would prefer online discussion. Why? Firstly, in online discussion, unlike face-to-face discussion, we do not have to wait our turn to talk. Secondly, I am a type of a shy guy and would be a bit nervous during face-to-face discussion. However, I find online discussion very comfortable for me and would therefore choose online discussion (#N)

One of the things I do not like about face-to-face discussion is the dominance of a number of students who sometimes do not give us opportunity to talk. If given opportunity, very often we are interrupted and it is quite intimidating. This will not happen in online discussion. Therefore, I would choose online discussion (#M).

Comments from the sample participants above indicate that online discussion is more preferable, primarily due to the absence of turn-taking in this environment. Online discussion also enables equal participation among participants, for they can participate simultaneously. Most importantly, online discussion enables shy participants to contribute to the discussion in the absence of dominance by certain students. These findings are consistent with what has been reported in the literature regarding the merit of online discussion [35], [36]. These comments clearly indicate agreement with data obtained through questionnaires reported earlier, whereby participants express their preference for online over face-to-

face discussion. However, again, their responses change when it comes to groupwork presentation as seen below.

**Question #3.** In your opinion, how effective is online groupwork presentation? What are the advantages and disadvantages? If given options, which one would you choose, online or face-to-face groupwork presentations? Why?

In my opinion, groupwork presentations should be conducted in a face-to-face classroom so that any comments from other group members can be attended to immediately. Of course, we can also do this online, but I think it is more interesting to have such presentation in a face-to-face classroom (#A)

As for groupwork presentation, I think it is better conducted in a face-to-face classroom because if there are things that need to be clarified or explained further by the respected presenter, they can be asked directly to the presenter (without delay) (#E)

Like face-to-face lectures, participants seem to indicate that groupwork presentation is better conducted face-to-face, for comments and feedback from both the teacher and the classmates can immediately be responded to without delay. In an online environment, however, especially when using asynchronous communication, the delay in both providing feedback and responding to such feedback is often unavoidable. So, again, this is an issue of immediacy as discussed previously [33], [34]. Interestingly, participants managed to reach a consensus when it came to the best delivery mode for quizzes.

**Question #4.** In your opinion, how effective are online quizzes? What are their advantages and disadvantages? If given an option, which one would you choose, online or offline quizzes? Why?

I enjoy online quizzes very much. Waiting for computer responses (after hitting the submit button) was quite a thrilling moment. The results of the quiz became available immediately without consulting the answer key. Even better, sometimes the computer explains why I got it wrong. In short, online quizzes are very interesting for me (#M).

I learn a lot from online quizzes. Online quizzes are so interactive that I occasionally feel that the computer is just like my lecturer who can provide me with feedback. Apart from the fact that it is interesting, online quizzes also save much time because the answer becomes immediately available along with the commentaries. With paper-based quizzes, we have to check our own work by consulting the answer key provided by the lecturer. At times, this process is boring. We hope that, in the future, the lecturer will continue to use online quizzes. We do enjoy online quizzes (#S)

As seen from the above comments, participants express their enthusiasm for and interest in online quizzes. Among the most common reason for opting for online quizzes over paper-based quizzes is the immediacy of feedback provided by the computer. With paper-based quizzes, participants need to

consult the answer key in order to check their answers. This process is, at times, very time consuming. With online quizzes, however, all they need to do is to hit the 'submit' button and, in a matter of seconds, the computer would reveal not only the answer key, but also the total score obtained by the quiz taker. Additionally, online quizzes are perceived to be more interactive, more engaging, and presumably more motivating than paper-based quizzes. In fact, as far as online learning is concerned, the value of online quizzes is well documented in the literature [20], [37]. Interestingly, participants' comments on online quizzes during interviews are a kin to their responses to the questionnaires, both indicating very positive responses. Thus, the quiz component of hybrid instruction is better provided online. This is similar with participants' responses to assignment submission.

**Question #5.** In your opinion, how effective is online assignment submission? What are its advantages and disadvantages? If given options, which one would you prefer, online or offline (face-to-face) assignment submission? Why?

As far as I am concerned, online assignment submission is both effective and efficient. We do not need to go to uni just to submit an assignment. Additionally, at times, when submitting assignments in class, a page could be missing and the lecturer assumes that I have not submitted my assignment. This won't happen when submitting assignment online as we can actually check the file uploaded, we can even download it anytime. Thus, I would prefer submitting my assignment online (#M)

I think submitting assignment online is easier and more efficient. As long as we have internet connection, we can submit assignment anytime anywhere without having to wait for the lecturer. Also, we do not have to go to uni (just for submitting assignment). In short, if given options, I would prefer to submit my assignment online because it is easier, all we need is the internet connection (#D)

As seen from participants' comments above, online submission of assignment seems to be more preferable than submitting assignments face-to-face and this observation confirms the data obtained through questionnaires discussed previously. Among the most popular reason for choosing online submission is that participants do not have to go to uni just to submit assignments. Also, online submission is perceived to be more secure (no missing assignment) than off-line (face-to-face) submission. In the last section, participants' responded to the question regarding mode of consultations.

**Question #6.** In your opinion, how effective are online consultations (with the lecturer)? What are its advantages and disadvantages. When given options which one would you prefer online or offline (face-to-face) consultation? Why?

I think online consultation is good. Not only does it enable us to formulate the problem that we want to discuss in a more detailed and comprehensive way, but it also enables simultaneous consultation (more than one student can talk at a time) without having to wait for our turn as what typically happens in a conventional classroom. Thus, if given a choice, I would probably opt for online

consultation, but I do not mind at all with face-to-face consultation (#E).

I would choose face-to-face consultation with the lecturer. I find it easier to understand when talking face-to-face with the lecturer. Looking at his facial expression, body language, and tone makes it easier for me to understand his explanation. Additionally, in a face-to-face consultation, I can directly ask questions if I have not understood what he has just said. So, I would tend to choose face-to-face consultation with the lecturer (#F).

Interestingly, of the six questions asked, only the last question seemed to vary in the participants' responses, in that they do not seem to make a hard and fast distinction between face-to-face and online consultations. In other words, whereas some students would prefer online, although not minding face-to-face consultations, others indicate that they would opt for face-to-face consultations.

## V. DISCUSSION

Based on participants' responses to both questionnaires and interview questions, it is clear that certain learning activities are more appropriately conducted online whereas others are better conducted face-to-face. Understanding the effectiveness of each learning activity relative to the mode of delivery is critical if we are to develop robust hybrid instruction.

Furthermore, it is worth emphasizing here that the choice of online or face-to-face does not depend exclusively on the types of learning activities alone. As postulated by the above media theories, the capacity and capability of the media also come into play. For example, whilst the present study finds that lectures are best conducted face-to-face, this conclusion should apply only to the communication media employed in this particular study, in which case lectures for the online component rely heavily on text-based communication. Things could be completely different when, for example, using teleconferencing for lectures.

Findings of this study provide partial support to the tenet of both MRT [28]–[30] and MST [31]–[38] theories. For example, with regard to presentation of groupwork, which requires discussion among participants to reach consensus, MRT correctly predicts that face-to-face communication is more preferable than online communication. From the standpoint of MST, presentation of groupwork requires communication media having the distinctive features of [+ immediacy of feedback] and [+ symbol variety]. However, discrepancies occur when it comes to group discussion, for MRT would predict that face-to-face communication is more preferable. In fact, the majority of the participants indicated quite clearly that they would opt for online, rather than face-to-face discussion.

It seems that the choice of online or face-to-face is related to not only task characteristics, but also to other variables such as students' characteristics. For example, qualitative data suggest that online discussion is more preferable than face-to-face discussion simply because students feel shy or nervous to express themselves in a face-to-face classroom which has nothing to do with task characteristics. Other variables concern the intimidating nature of face-to-face discussion. In this case, one student made it clear that fellow students' dominance and

frequent interruption during face-to-face discussion was quite intimidating and it is for this reason that online discussion was more preferable as far as this student is concerned. Indeed, research studies have shown that online discussion is less intimidating for some students [39] and it is natural that they would choose this communication media for discussion regardless of task characteristics. Note that group discussion is different from groupwork presentation, in that the latter requires more immediate feedback.

Similarly, participants also indicate that they would choose to attend face-to-face rather than online lectures. MRT would predict that for the delivery of course materials (distribution of information), online written communication would be more appropriate, which does not seem to be the case in the present study. As argued previously, there seems to be factors other than task characteristics and communication processes that come into play, as far as the choice of media is concerned. For example, qualitative data indicate that face-to-face lectures are more preferable simply because of teacher's immediacy and the provision of immediate feedback. Again, this reason has nothing to do with task characteristics and communication processes. In fact, research suggests that face-to-face interaction with the teacher is still regarded as a pre-requisite to good education by some students [20] and perhaps it is this perception that makes face-to-face lectures more preferable. Thus, the choice of which media to use appears to be much more complex than task characteristics or communication processes.

Finally, it is worth re-stating that, strictly speaking, it is not a combination of face-to-face and online that makes hybrid instruction 'the best of both worlds' as commonly implied in the literature—it is *an appropriate* combination that does. In fact, a mismatch between mode of delivery and the learning activities could potentially turn hybrid instruction to the worst of both worlds. Throughout this paper, we have argued that robust hybrid instruction can only be developed with sound understanding of the strengths and weaknesses of both online and face-to-face formats. Lack of this knowledge may result in combining the weaknesses, rather than the strengths, of each mode [9], [24].

## VI. CONCLUSIONS

The primary objective of this study was to scrutinize what learning activities are best conducted face-to-face and what learning activities are more appropriately conducted online using Nicenet. This study found that lectures are best conducted face-to-face, group discussion online, presentation of group discussion face-to-face, quizzes online, assignment submissions online, and consultations with the lecturer can be equally effectively conducted in either mode. However, these findings should only be interpreted in the context of the communication media employed in the present study (i.e. using Nicenet as the Learning Management System). Needless to say, a hybrid design employing different communication media to support the above learning activities would most likely yield different results. Identifying learning activities relative to media capability would, therefore, be an interesting avenue for further research. Throughout this paper, we have argued that hybrid instruction can only be 'the best of both worlds', as commonly suggested in the literature, if we

correctly match the learning activities and the mode of delivery. Failure to do so will result in combining the weaknesses of both modes, thus 'the worst of both worlds'. All in all, findings of this study appear to partially confirm the postulate of MRT and MST theories and, at the same time, suggest that the choice of media might involve complex consideration, more than just the capacity of the media or the characteristics of the task.

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