International Journal of TESOL Studies (2023)
Vol. 5 (1) 5-21 https://doi.org/10.58304/ijts.20230102

Article

Re-inventing Critical Thinking and Writing Tasks Using a CDL Approach

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Received: 31 March, 2022/Accepted: 13 October, 2022/Published: 6 December, 2022

Abstract
This paper discusses how we integrated critical thinking and academic literacy with disciplinary content in a communication skills module for Computing students. The module aims to develop students' academic literacy, and at the same time, their ability to critically question issues related to their discipline or profession. Previously, for the writing task, each student had to write an argumentative essay on a topic and question that they wish to explore within a given theme. However, feedback from students and some faculty members suggested that such a task may have limited relevance to Computing students. When redesigning the course, we approached it from the perspective of critical digital literacy (CDL). This approach emphasizes the need to re-balance between a competency-based digital literacy approach built around hard IT skills such as coding, and a capacity-based digital literacy approach focused on "distinctively human capacities" (Bass, 2018, p. 37) such as creativity and critical thinking. We adopted the five-resources CDL pedagogical model proposed by Hinrichsen and Coombs (2013) and framed the different communication tasks within this model. Instead of academic essays, students were to apply all five CDL resources to write an online commentary in response to a digital text within the given theme. To determine whether students found value in this task and in this novel CDL approach, pre- and post-course surveys were conducted. The rationale and implementation of this redesigned writing task are described in this paper, followed by the survey findings and our reflections on the course redesign process.

Keywords
Academic literacy, critical digital literacy, critical thinking, writing for Computing students

1 Teaching Context

At our writing centre in an autonomous university in Singapore, we collaborate with departments and faculties across the university to meet their students' English and communication needs for the university and the workplace. Apart from some specific language courses, all instruction at our university is conducted in English.

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The module that is discussed in this paper is a compulsory writing and communication module for all Computing students. Before taking this module, they would have achieved a threshold level of proficiency in academic literacy. Specifically, they have either been exempted from proficiency modules conducted by our centre or passed them in previous semesters. Once they satisfy this prerequisite entry criterion, students can choose to take this module in any semester during their undergraduate course of study. Therefore, a class may be comprised of students from different years, ranging from first- to final-year students.

Entitled *Communicating in the Information Age*, this module aims to develop students' academic skills and practices, and at the same time their ability to critically question issues related to their discipline or profession. In this module, students learn to question and articulate their analysis of assumptions and assertions on issues facing the Information Age through processes such as identifying bias and substantiating arguments. Students are first introduced to influential models of critical thinking outlined in Ennis (2015) and Paul and Elder (2020). They then apply the principles of critical thinking to analyse online information and articulate cogent responses to arguments or defend their own positions in both written and oral form. Although this course was first offered in 2016, it has undergone several changes since then, the most significant of which has been the move to online learning due to the COVID-19 pandemic in 2020.

2 Rationale for Course Redesign

In the university Course Feedback questionnaire, the first item seeks the students' "overall opinion of the module" on a Likert scale of 1 to 5. The score for this item, which reflects students' overall perception of their learning experience and satisfaction, was less than satisfactory in the previous academic year. From a preliminary inspection of the free-text comments, approximately one-third of the comments relate to the course content, and another one-third expressed concern with the heavy workload. Finer examination of the feedback identified several comments on how the course content is too abstract, too rigid and irrelevant.

In the literature, students' learning experience can be defined as "their interaction with the teaching and learning environment" (Ning & Downing, 2012, p. 220). It encompasses several aspects, three of which are perceived workload, clear goals and standards and assessment methods (Ramsden, 1991). Another important aspect of the teaching and learning environment has been found to be that of establishing relevance (Kember et al., 2008). When students do not see how the course content is applicable to their discipline or profession, they easily become demotivated (Albrecht & Karabenick, 2018). Furthermore, it has been shown that students' learning experience influences learning outcomes both directly and indirectly (Lizzio et al., 2002; Ning & Downing, 2012).

Based on the student feedback and the literature, we identified the need to address two main elements of student learning experience: workload and relevance. To target the first aspect of workload, we reviewed and streamlined the tasks and assessments so as to reduce the workload without compromising on the intended learning outcomes. For example, we reduced the number of peer reviews each student had to do, and allotted one class session for them to carry out the peer review so that they did not have to spend time outside of class hours on the review.

As for the second aspect – relevance – we decided to approach the course content from the perspective of critical digital literacy or CDL (Hinrichsen & Coombs, 2013; Pangrazio, 2016). It seeks to re-examine the focus of technological integration and emphasizes the need to re-balance between a competency-based digital literacy approach built around hard IT skills such as coding and a capacity-based digital literacy approach focused on "distinctively human capacities" such as "creativity, critical thinking, systems thinking, entrepreneurship, (and) cultural agility" (Bass, 2018, p. 37). In other words, it posits that the integration of technology into the classroom plays a part in developing learners' critical digital literacy, i.e. the capacities to critically question issues related to their discipline/profession and leverage their skills and knowledge to address bigger societal challenges such as inequality or climate change (Bass, 2018).

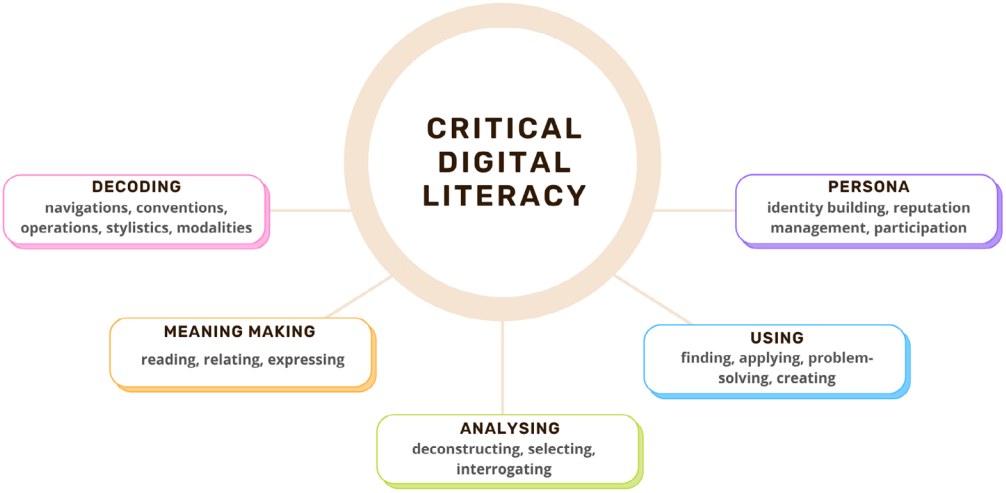
The course content and assessment tasks were reframed based on the following five-resources critical digital literacy framework adapted for higher education (Hinrichsen & Coombs, 2013):

1. Decoding – practical and operational engagement
2. Meaning making – narrative complexity in the digital
3. Using – producing and consuming digital texts
4. Analysing – becoming discerning practitioners
5. Persona – identity issues and the digital

Emphasizing reader roles, learner processes as well as text construction in the digital context, this framework is illustrated in Figure 1.

Figure 1

The 5-Resources Model of Critical Digital Literacy (Hinrichsen & Coombs, 2013)



Not only are students expected to analyse and evaluate varied digital texts and media, but the module also requires them to articulate their interpretations and judgements of the texts in the form of a project paper, extemporaneous and prepared speeches, and a written reasoned response to a discipline-related issue they identify. The fifth resource, **persona**, or the presentation of self, is of particular relevance and significance. In addition to engaging in digital interaction and exchange within their virtual classrooms, learners also get to build their identities in the online space by taking part in ongoing discourse on societal issues related to their discipline, or the far-ranging impact of their discipline or profession on society.

This section has explained how the student feedback on the module indicated a need for the module to be redesigned, firstly to lighten the students' workload, and secondly to help students see how CDL skills are relevant and important for computing professionals. By approaching technological integration from the "humanics" standpoint (Aoun, 2018), we hope to encourage learners to transcend the technological world around them and critically question how they can leverage their skills and knowledge to address bigger societal challenges and play a more constructive role as engaged citizens in the Information Age. Through this CDL approach, we believe that students will see the relevance of the knowledge, skills and attitudes that are intended learning outcomes in the module.

3 Rationale for the Redesign of the Writing Task

Previously, for the writing task, each student had to write an argumentative essay on a topic of their own design within a given theme. However, through feedback from students and some faculty members, such

a task was deemed to have limited relevance to Computing students. Some students felt that the essay task was similar to what they had to write in Junior College and did not require learning new skills. We explored the possibility of setting writing tasks that were closer to the kinds of tasks a computing professional might encounter in their workplace. These involve technical writing, and could take the form of product proposals, progress reports or product documentation such as user guides and developer guides. However, such tasks are already taught and covered in another communication skills module for Computing students. Besides, such writing should be based on a computing project that students are working on. They are more appropriately taught in modules that are twinned with or embedded within disciplinary modules.

Since it was felt that the writing task should retain the requirement of critical thinking and argumentation, we changed the artefact from an argumentative essay to a position paper. For this task, students were expected to take a position on a controversial issue relevant to a given theme and write a paper of about 800 words arguing for that position with appropriate and accurate substantiation. However, that was not satisfactory either because genuine position papers are often much longer than 800 words and are more relevant in a situated learning environment rather than a current social issue. One student commented on it being "distant from what will be really needed for academic writings [*sic*] for people in the IT industry." Some found it difficult to identify a topic to write on, while others did not see how critical thinking skills were applied in producing the essay or position paper.

The challenge before us as course developers was to design a writing task that not only helped students to demonstrate critical thinking and academic literacy, but was also aligned with the discipline and the desired professional outcomes of the department or faculty. Additionally, it had to be a task that was consistent with the CDL approach to be adopted. According to Cilliers (2012), writing tasks can typically be classified as Writing for Learning (WFL), Academic Writing (AW) or Professional Writing (PW) tasks. PW was already taught and assessed in an existing module for Computing students, and WFL tasks tend to be shorter and more informal, such as article critique or peer reviews. We had to reinvent the notion of Academic Writing for Computing students, where we help students develop the principles of academic writing together with CDL skills as content creators in the Information Age.

In keeping with the adoption of the CDL approach to the module, there was a need to find a writing task that was authentic, suitable for the Information Age, and required students to articulate a researched, evidence-based argument on a given topic. The first half of the course focused on developing students' CDL skills as consumers or users of online digital texts, specifically the **decoding**, **meaning-making** and **analysing** resources. We sought to design a task that would build on these skills and develop the other two of the five resources of the CDL framework (Hinrichsen & Coombs, 2013). The writing task was then changed to an online commentary where students were required to write a critical response to a recently posted digital text. In so doing, they engage more with the **using** and **persona** resources of CDL, adding to an ongoing discourse as Computing students and establishing themselves as amateur writers on social publishing platforms such as *Medium*.

The specifications of this commentary were clearly defined, according to principles similar to those for academic writing, which can be defined as "the art of producing a structured and researched written argument to inform peers about a particular subject" (Cilliers, 2012, p. 1030). The point of departure from the usual academic essay lies in the style of writing, which is more informal and audience-centric, tailored for the general educated reader of online texts.

Thus far, we have shown how the writing task in particular needed to be reinvented, to develop students' academic literacy and at the same time satisfy the criterion of 'relevance' for computing students. The following section will provide details of the task, the scaffolding activities and supporting mechanisms.

4 Writing the Online Commentary – Scaffolding Activities

Against the backdrop of the five-resources CDL pedagogical model (Hinrichsen & Coombs, 2013),

students were tasked to write an online commentary in response to a digital text (focal text) within the given theme, for example "Balancing trade-offs in the use of IT". The focal text could be news articles, opinion pieces, videos, tweets or other online posts. The intended learning outcome was that the students should be able to articulate their ideas, views and analyses confidently and cogently, with appropriate and accurate substantiation in their commentaries. To complete the writing task, students were expected to apply all five resources of the model to (1) deconstruct the chosen focal text to identify an angle/perspective they could address to add value to the ongoing discourse about the topic in question, and (2) articulate their perspective or stand in a persuasive and engaging commentary.

First, the **decoding**, **meaning making** and **analysing** resources were used to deconstruct the focal text and identify an angle to add value to an ongoing online discourse. According to Hinrichsen and Coombs (2013), the **decoding** or ***code breaking*** resources are concerned with "practical and operational engagement" with digital texts, particularly "the ability to both decipher and produce (encode) texts at a practical level." (p. 7) This requires familiarity with the navigation, conventions, operations, stylistic features as well as modalities of the digital text in question. For example, if students choose to deal with a commentary on BBC about China's vaccine diplomacy (Wong, 2021), not only would they need to decode the written text itself but they would also need to understand the meaning and purposes of other interactive and multimodal elements such as hyperlinks, images and even any video footage that comes with it. They also have to manoeuvre their way through attractive advertisements in between paragraphs as well as eye-catching thumbnails and titles of other BBC articles on the right side of the webpage.

As students engage in greater depth with the digital text and its interactive elements, they need to leverage the **meaning making** or ***text-participating*** resources (Hinrichsen & Coombs, 2013, p. 7) to help them understand and interpret the "narrative complexity" of digital texts. As seen in the example of the BBC commentary, to make meaning of the article's key message, readers need to leverage their existing knowledge about China's vaccine diplomacy to make sense of what is written about the deployment and efficacy of China-made vaccines in developing countries in the article. The hypertextual and multimodal nature of the digital text also means that the process of building such cognitive linkages could be rhizomatic or "networked" as readers follow the hyperlinks to read or watch related contents within the BBC platform and beyond. Inadvertently, the meaning making of digital texts is no longer linear. Instead, it could be fluid and filled with conflicting narratives (Bayne, 2006; Pachler & Daly, 2009), calling for higher levels of mental adaptiveness (Hinrichsen & Coombs, 2013).

Beyond **meaning making**, discerning consumers of digital texts should be able to deconstruct what they are reading, watching or listening at a deeper level. Not only do they need to make informed judgments and draw conclusions about the texts, but they also need to critically interrogate any inherent ideology (Buckingham, 2006) as well as the "provenance, purpose and impacts of digital content and interactions" (Hinrichsen & Coombs, 2013, p. 11). This is where the **analysing** resource comes into play. While the information gathered using the decoding and meaning making resources would serve as a good starting point, effective analysis of a source to make informed judgments and draw warranted conclusions underscores the importance of critical thinking competencies. In this regard, the critical thinking frameworks introduced at the beginning of the semester significantly concretise the **analysing** resources.

Specifically, students were introduced to Ennis' (2015) list of 12 dispositions and 18 abilities that an ideal critical thinker should possess to engage in "reasonable reflective thinking focused on deciding what to believe or do" (p. 32) (Figure 2). They also learned about Paul and Elder's (2020) framework that charts a path to develop eight intellectual traits or virtues by applying a set of nine intellectual standards to eight elements of thought as they engage with information sources (Figure 3). The reflexivity and systematicity of analysing and evaluating information, together with the emphasis on keen observations, rigorous questioning and sound reasoning embodied in these frameworks, aptly complement the **decoding**, **meaning making** and **analysing** resources.

Figure 2

Overview of Ennis' (2015) Critical Thinking Abilities

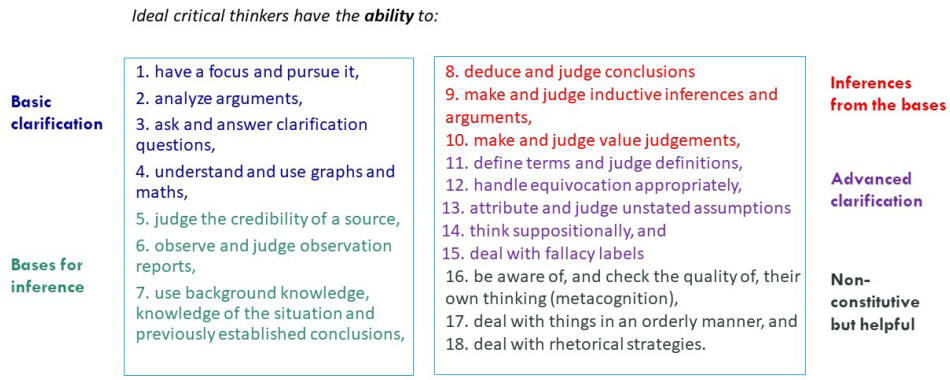
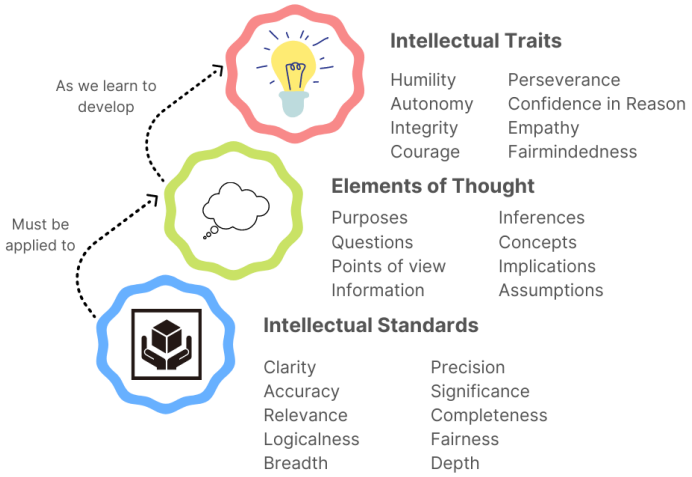


Figure 3

Paul and Elder's (2020) Substantive Approach to Critical Thinking



In the first half of the semester, students completed a group project to develop their own standard operating procedure (SOP) for online information processing. The SOP could be based on either framework or both. Students were also allowed to adopt a different critical thinking framework if they could reasonably justify such a choice. The SOP should be memorable, streamlined and versatile enough to help users take essential steps to critically decode, make meaning, analyse/evaluate and draw conclusions about digital texts of varied modalities. It would then serve as a useful tool for students to deconstruct a focal text for their online commentary subsequently.

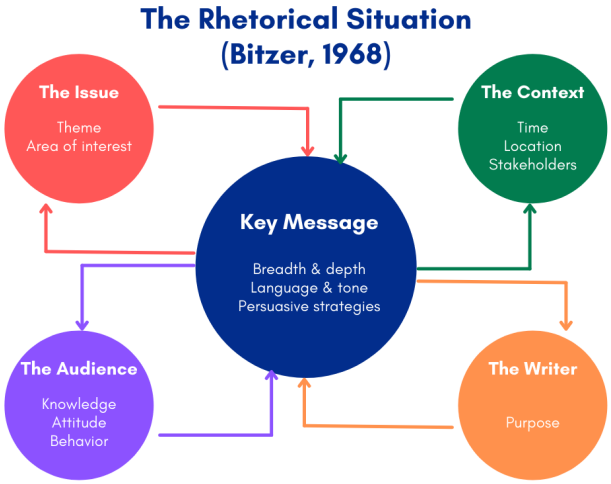
To guide students on how they could add value to the ongoing discourse on the topic of their choice, we employed Paul and Elder's (2020) conception of *The Figuring Mind* as it provides a systematic and comprehensive process to "figure out" (p.18) their chosen focal text. Students would first apply their SOP for online information processing to understand the focal text's key message and line of reasoning. Upon establishing an accurate understanding of the focal text's stand and arguments, students would then question the text using the intellectual standards such as clarity, precision, relevance, accuracy, depth, breadth, logic, fairness and sufficiency (Paul & Elder, 2020) as a guide. Students were also advised to research other sources related to the topic addressed in the focal text to have a broader contextual understanding. All these analyses and additional research formed a base for the students to identify an underlying issue or aspect of the focal text worth responding to in their own commentary.

After figuring out the focal text's key message and deciding on an angle for their response, the students embarked on drafting their commentaries. This is when the **using** and **persona** resources became more prominent. First, the ***text using*** resources encompass higher-order digital literacy with a focus on (1) gathering relevant information and resources, (2) "deploying tools and techniques effectively for given purposes and audiences within the bounds of ethical, legal and usability criteria," (3) exploiting digital tools for problem finding and definition, problem analysis and approaches to solutions," and (4) "generating imaginative approaches, techniques, artefacts or content" (Hinrichsen & Coombs, 2013, p. 10). Intertwined with the **using** resources is the **persona** resource or the ***presentation of self***. Cultivated through processes of identity building, managing reputation and participating in digital interactions, the presentation of self is underpinned by an awareness of "one's own roles within different digital environments and sensitivity to relationship and alignment within groups and communities." (Hinrichsen & Coombs, 2013, p. 12). It is also demonstrated through how users protect and partition their online activity as well as engage in virtual collaborations with sound ethical and intercultural understanding (Hinrichsen & Coombs, 2013).

In the context of the online commentary, the students were placed in the writer's seat and required to write their own persuasive response to the focal text and publish it on Microsoft Sway, a digital storytelling app that is part of the Microsoft 365 suite. To allow students to see how their article is related to the larger and possibly much more complex discourse surrounding the issue addressed in the focal text, Bitzer's (1968) conception of ***the rhetorical situation*** was introduced (Figure 4). By situating their article – distilled as the ***key message*** – within the nexus of issue, context, audience, medium and writer, each with its own set of constraints, students were able to form the cognitive linkage between the issue in the focal text and how they wish to express their persuasive response in writing.

Figure 4

The Rhetorical Situation and Its Impacts on Writing (Bitzer, 1968)



To develop their response, students could choose to (1) agree with the author's stand and extend the argument further, (2) disagree and argue for a contrary position, (3) present a new perspective on the issue, using the focal text as a springboard for their argument, or (4) challenge the status quo and argue for a novel IT solution to be implemented. To help students develop a clear, logical and persuasive line of reasoning, apart from deductive and inductive writing style, we also revisited established argumentation and persuasion approaches such as the Toulmin method of argumentation (Toulmin, 1958, 2003) and Monroe's Motivated Sequence Pattern (Monroe, 1935; Lucas, 2014). While the former represents a rather ego-centric process that focuses on argument strength – the crux of argumentation – the latter is arguably more audience-centric

as it charts a progressive pathway to persuade people through piquing their interest, establishing common grounds and goodwill, connecting and convincing them with tangible and concrete win-win action plans. Such nuanced understandings of argumentation and persuasion would help students find their own voice and enter the discourse surrounding the issue in question with both criticality and empathy.

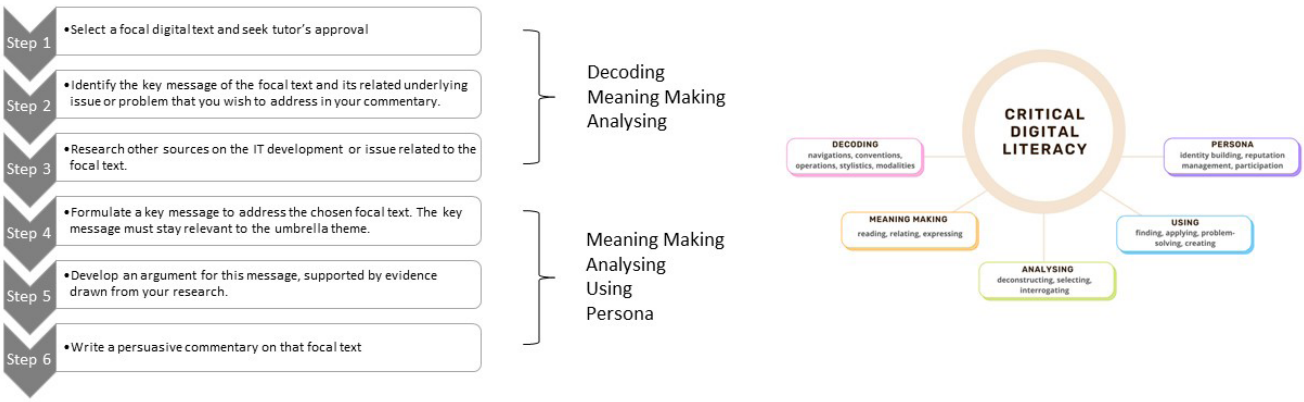
Once the students have developed a clear line of reasoning and gathered enough evidence, they would begin the writing process. Both the **using** and **persona** resources are leveraged here to write an article that would be not only engaging and persuasive to online readers but also reflective of the authorial voice the student writers wish to project. Specifically, students learned the common practices and stylistic features of online writing from their instructors and resources provided. The insights shared with them were distilled from the growing research on user interface design and online reading patterns (Moran, 2020; Pernice, 2019) pioneered by the Nielsen Norman UI/UX consulting firm. In addition, to help students develop their credibility as online content creators, the practice of using contextual hyperlinks (Pernice, 2014) as an alternative to in-text citations in online writing was also introduced. Students were requested to provide an end-of-text reference list following a specific citation format, according to the practices of conventional academic discourse.

To project their authorial voice, or ***persona***, students learned about the connections between rhetorical appeals and language use (Gagich & Zickle, n.d.; Minervini et al., n.d.) and (data) storytelling (Berinato, 2019). A scaffolding activity in the writing tutorial which required students to analyse the line of reasoning and rhetorical strategies deployed by a *Medium* response authored by Tyler Kingkade (2019) to Mark Zuckerberg's vision for a privacy-focused network (Zuckerberg, 2019) visualised the full process undertaken by Kingkade from figuring out the focal text (Mark Zuckerberg's article) to developing a stand and articulating it in his response published on *Medium* (Kingkade, 2019). Conscious decisions about word choices, punctuation and other stylistic features to express the stand, analyses and evaluation cogently and engagingly were also discussed and highlighted so that students could keep them in mind when writing their own articles.

In summary, the online commentary task consists of six steps (Figure 5) and the completion of each step requires different critical digital literacy resources in one way or another.

Figure 5

Alignment between the Online Commentary and Critical Digital Literacy Framework



After students had completed the draft, they were asked to exchange their drafts with an assigned peer within the class to conduct a peer review guided by a given rubric. Following the peer review, students met the instructor for a one-on-one conferencing session where they could consult the instructor on their draft or on the peer review comments received. At these conferencing sessions, instructors could point out any major issues identified in the draft and suggest revisions. Neither the peer review nor conferencing activity is unique to the task of writing the online commentary as they have always been part of writing

instruction at the writing centre, being recognised in the literature and in practice as activities that are beneficial to the students (e.g. Huisman, et al., 2019; Crossman & Kite, 2012; Cho et al., 2007).

Students made the necessary revisions based on the peer reviews and instructor's comments before submitting it as a document on the MS Sway platform. They were further encouraged to publish it online on *Medium*, although that was optional.

5 Feedback from Students

As a common practice that accompanies syllabus revision, a study was conducted to determine if the revision of the course and the writing task were well received by the students. As it was not feasible to carry out an experimental study with a control group, or with pre- and post-course writing texts, we used pre- and post-course surveys for the study. The survey elicited responses on students' perceived writing abilities at the beginning and end of the module. Additionally, we examined the post-course student feedback to check for comments indicating the effects of the course and task revision.

With reference to the alignment between CDL and the online commentary writing task above (Figure 5), the specific writing skills that students are supposed to cultivate include (1) developing a clear line of reasoning, (2) substantiating argument with credible and balanced evidence, (3) writing clearly, accurately and concisely, (4) using rhetorical strategies in a balanced and appropriate manner, and (5) adapting the language use to suit the genre, medium and target audience. The perceived growth in these commentary writing skills was measured by comparing the anonymous pre-course and post-course survey data collected at the beginning of the module (after the students had their first tutorial that introduced the course syllabus and CDL framework) and at the end of the module in their final tutorial. A total of 350 students completed the pre-course survey. On a scale from 1 to 5 (1 = Not Applicable, 2 = Strongly Disagree, 3 = Disagree, 4 = Agree, 5 = Strongly Agree), they were asked to indicate their perceived writing abilities. Similarly, the same abilities were replicated in the post-course survey completed by 181 students.

Aggregated percentages of agreement and disagreement ratings show noteworthy growth in online commentary writing skills. Across all the five specific commentary writing skills, there was a sharp decline in the number of students who disagreed that they were unable to accomplish these skills. Conversely, there was a noticeable increase in the number of students who perceived an improvement in each of the targeted abilities. Figures 6 to 9 show the differences in the perceived abilities indicated in the pre- and post-course survey responses from the students.

Figure 6

Ability to Develop a Clear Line of Reasoning

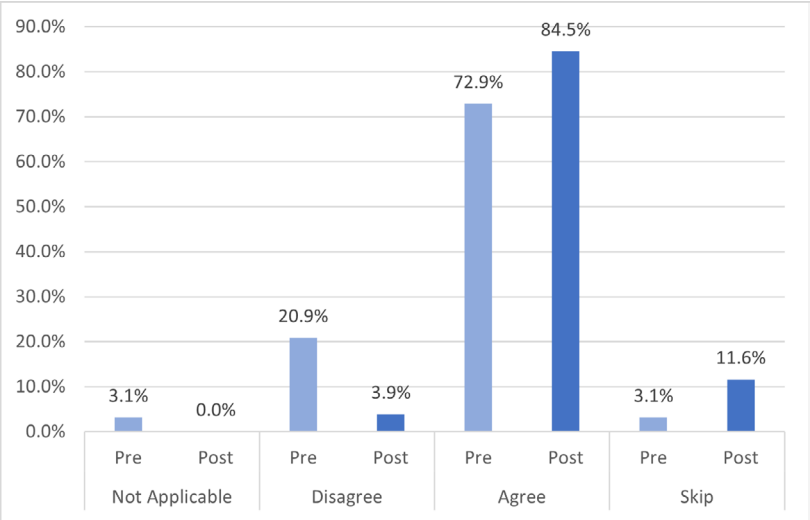


Figure 7

Ability To Substantiate My Argument with Credible and Balanced Evidence

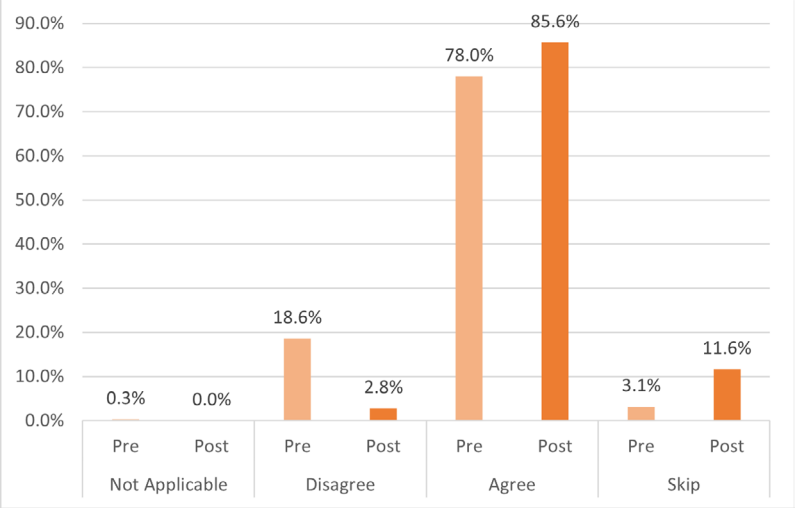


Figure 8

Ability to Write Clearly, Accurately and Concisely

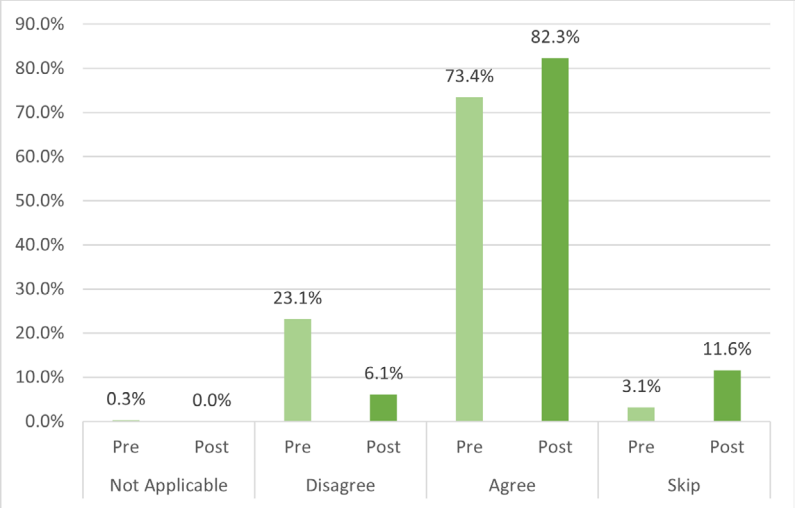


Figure 9

Ability to Use Rhetorical Strategies in a Balanced and Appropriate Manner

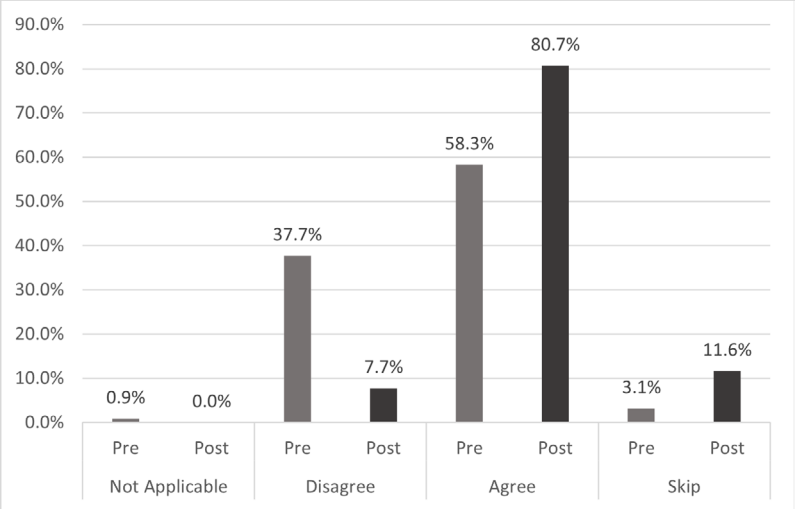
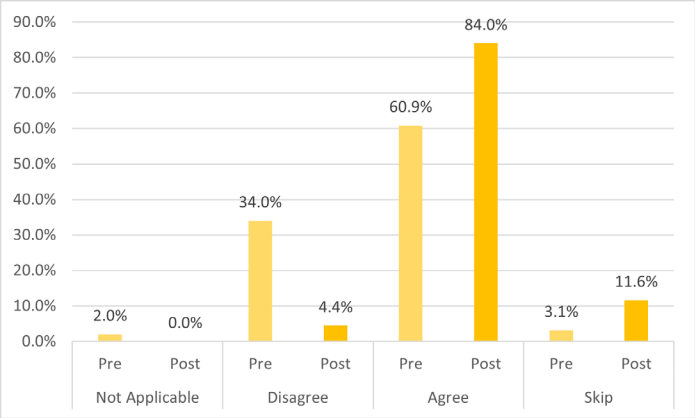


Figure 10

Ability to Adapt the Language Use for My Online Commentary to Suit the Genre, Medium and Target Audience



Note: The figure for "Disagree" is the sum of figures for "Strongly Disagree" and "Disagree"; the figure for "Agree" is the sum of figures for "Strongly Agree" and "Agree".

The perceived growth in writing abilities documented here is remarkable, considering that in the pre-course survey, many students indicated writing as the component they were most likely to succeed in. Their responses to the open-ended question "Which components of the module do you see yourself being the most successful with?" are presented in Figure 11 in the form of a word cloud.

Figure 11

Student Responses to "Which Components of the Module Do You See Yourself Being the Most Successful with?"

In the post-course survey, apart from general key takeaways such as "how to write a good commentary and analyse online sources", a student shared an apt observation, "...writing a commentary is about the same as an argumentative essay but a more audience-centric wording is used." Such awareness of the need to use "audience-centric wording" or to critically engage with online sources seems to signify growth in the **using** and **persona** resources whereby being mindful of empathy, clarity and analytical thinking in content creation is constitutive of his/her persona as an online content creator.

An additional source of data we used to evaluate the innovation was the end-of-semester student feedback from the university-wide course evaluation exercise. Although most of the qualitative feedback from the students tended to be general, there were some comments on the writing task which we found helpful in our evaluation of the course revisions. The positive comments included the following:

> "I liked the online commentary task CA3, it was interesting to be able to find an article of our choice and reflect on it."
>
> "Writing an online commentary is more interesting compared to writing academic essays. Not to mention, you can choose a topic that you like."
>
> "Writing the commentary was quite fun"

There were a few negative comments about how the writing tasks in the module added to the workload and how the students did not see the relevance of the module to their computing major. These comments are addressed in Section 6.2.

6 Reflection

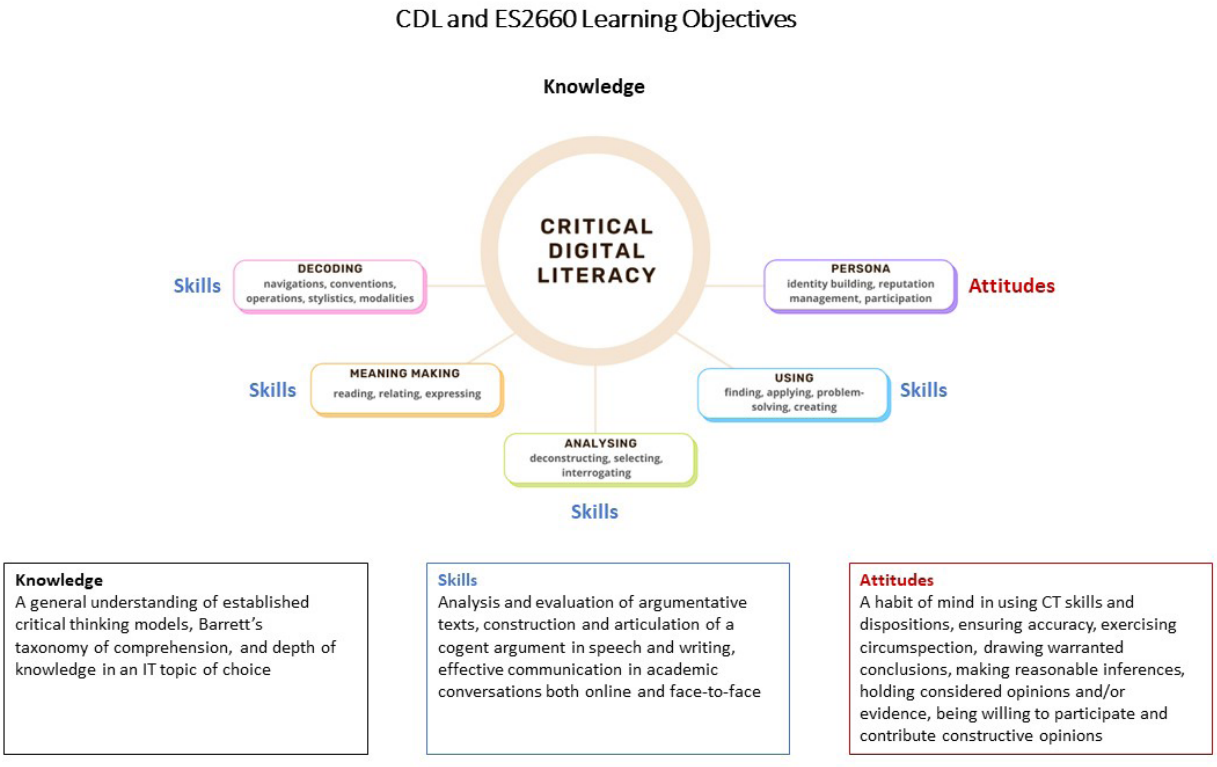
6.1 Discussion

As mentioned in the beginning of the paper, the redesign of the course and the writing activity was driven by the need to enhance the relevance of the syllabus to Computing students, and by extension, improve their learning experience. In essence, adopting the CDL framework and revamping the writing task to capture the five CDL resources points to the importance of ensuring constructive alignment among the learning activities, assessments and intended learning outcomes to catalyse a meaningful learning experience for learners (Biggs, 2003).

We believe that the CDL framework is the missing piece that connects the module objectives of cultivating essential elements of knowledge, skills and attitudes for critical thinking to the context of the Information Age. In other words, CDL helps provide a solid foundation to ground the intended learning outcomes of the module, as seen in Figure 12 below.

Figure 12

Alignment between CDL and Module Objectives



The quantitative data from the pre- and post-course student surveys presented in Figures 6 to 10 are encouraging as they indicate clear growth in the targeted student abilities. Although they are only an indication of the students' perceptions of their abilities and not actual development, research has shown (e.g. Camgoz, 2008; Gore, 2006) that there is a positive correlation between self-efficacy and academic performance. So if we take the student's perceived abilities as self-efficacy in social cognitive theory, or students' belief in their abilities to exercise control over their actions or events that affect them (Bandura, 1997), we can surmise that the online commentary writing task has helped to develop students' academic writing skills.

The qualitative feedback in the form of positive comments also shows that the change is a welcome one. Instructors on the course have observed during interactions with the students at the consultation sessions that students found the task of making their writing audience-centric novel and enjoyable. These comments are a pleasantly refreshing change compared to those received on the writing tasks of previous semesters. The small shift in attitudes towards the writing task suggests that our efforts have been successful to some extent.

It would seem that with the redesigned writing task, we have managed to help students develop not only academic skills of critical thinking and evidence-based argumentation in writing, but also important skills relevant to the Information Age, such as the ability to engage with and produce engaging and persuasive digital texts, a predominant source of information in the Information Age.

6.2 Challenges encountered

Despite the positive responses discussed above, the implementation of the revamped writing task was not without challenges. First, the module objectives of cultivating both writing and communication skills grounded in critical thinking knowledge necessitate proper unpacking of the two critical thinking frameworks introduced before launching into various assessment components. Meeting the students twice a week has been helpful in covering the content and skills intended. Nevertheless, time constraint remains an issue as seen in how only two tutorials on online writing could be conducted in Semester 1 AY2021/22 (so as to give the students more time to practice academic conversational skills assessed in the panel discussion). To support student learning, self-access materials on online writing were provided. However, it was unclear how many students had benefitted from these materials. We recognised this issue and increased the number of tutorials for online writing to three in Semester 2. The impact is yet to be seen, but we stay hopeful that the students will feel better supported.

Second, as this module is offered to Computing students at all levels from first- to final year, the student cohorts tend to exhibit varying degrees of maturity and motivation that may influence how they perceive the relevance of the module to their Computing major. In the course feedback for Semester 1 AY2021/22, a student noted how the module "tackles areas where computing students are likely to be weakest in – presentation skills, thinking on the spot, and coming up with logical and sound arguments." The relevance and usefulness of the course are also acknowledged in the following comments, "Content is relevant and useful for my future" or "Taught surprisingly useful critical thinking skills that i [*sic*] did not pay much attention too [*sic*] before."

On the contrary, some students dismissed the relevance of the module and some assessments to their major. For example, a student asserted that they did not like the module because it is not relevant to the major and that "writing commentaries and having panel discussions are the opposite of what I will do / experience in whatever jobs that I will take in the future." Another student noted that "The content just doesn't peek [*sic*] my interest."

The contrasting opinions and sentiment above point to the pertinent issue of motivation, attitude and language learning. Those who recognised the relevance of the module and showed a willingness to

engage and appreciate the content and skills imparted seemed to be more intrinsically motivated and see learning as a reward (Arnold, 2000). On the other hand, the insistence on the irrelevance of the course seems to suggest that the students may be extrinsically motivated and only learn when tangible rewards are in sight (Arnold, 2000). According to Gardner (1988), motivation could be multidimensionally manifested in terms of cognition, attitude and behaviour. As seen in both the positive and negative feedback, the varying motivations are manifested (1) cognitively through opinions about the course (relevant/irrelevant), (2) affectively through feelings about the course (surprised by the usefulness/ disinterested), and (3) behaviourally through engagement with the course content and skills imparted (paying/not paying attention).

Apart from varying motivations, the mixed cohort also have a wide range of writing and communication abilities that may influence their perceived self-efficacy as mentioned above. As shown in Figure 12, the majority of students who responded to the pre-course survey seemed to be more confident about their writing than speaking skills. In the context of the revamped writing task, the disparity in writing skills might not be significant due to the novelty of the commentary genre to Computing students. Nevertheless, this remains a noteworthy challenge for the course overall considering the different types of assessments, both written and oral, lined up for the students.

In summary, time constraint, varying motivations and a wide range of communication abilities are the main challenges we faced when implementing the changes.

6.3 Limitations and future work

One of the limitations in our evaluation of the task redesign is that the pre- and post-course surveys were anonymous, so it was not possible to map individual students' responses in the pre-course survey to those of the same students in the post-course survey. We could only rely on aggregated percentages of the responses. With these, we could not ascertain if any particular student indicated growth in the targeted skills. A related drawback is that with these aggregated figures, it is not meaningful to analyse the figures using statistical tests for significance.

Another limitation is that the survey data only revealed the students' perceptions of self-efficacy and not their actual achievements. Evidence on the impact of the intervention on their writing abilities can be obtained through experimental methods involving control groups and pre- and post-course writing tasks, all of which are impractical to administer with the constraints on time and other resources.

Additionally, the design of the current study does not provide parallel data sets for a fair comparison of student perceptions of their overall learning experience in the module before and after the syllabus revision. There could be many confounding factors when we compare student feedback from the cohort of different semesters, such as student characteristics of maturity, prior experience of communication modules, and workload from other modules.

The online commentary writing task has been implemented for two semesters now, including the current semester. For the current semester, pre- and post-course student feedback will be analysed as before. In addition, focus group discussions will be held to gather more detailed feedback from the students so as to inform us on how the task can be improved for future iterations.

7 Conclusion

This paper discusses how we integrated critical thinking and academic literacy with disciplinary content in a communication skills module for Computing students. In our efforts to make the module more relevant to the students, we adopted a CDL approach, which necessitated a redesign of the writing task in the module. The new task, writing an online commentary, was aimed at helping students develop skills

for articulating their ideas, views and analyses confidently and cogently, with appropriate and accurate substantiation in a critical response to a digital text. Through the pre- and post-course surveys, we found that the change was generally well-received in terms of students' attitudes towards it.

More importantly, the data indicated that students perceived growth in their writing skills, and hopefully such perception of self-efficacy also resulted in improving their academic performance. The findings may be simple and lacking the rigor of statistical experimental methodology. Nevertheless, the results are encouraging and warrant further work in exploring the effectiveness of this innovation in improving student learning experience and writing achievement.

References

Albrecht, J. R. & Karabenick, S. A. (2018). Relevance for learning and motivation in education. *The Journal of Experimental Education*, *86*(1). https://doi.org/10.1080/00220973.2017.1380593

Aoun, J. E. (2018). *Robot-proof: Higher education in the age of artificial intelligence*. MIT Press.

Arnold, J. (2000). *Affect in language learning*. Cambridge University Press.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.

Bass, R. (2018). The impact of technology on the future of human learning. *Change: The Magazine of Higher Learning*, *50*, 3-4, 34-39. https://doi.org/10.1080/00091383.2018.1507380

Bayne, S. (2006). 'Temptation, trash and trust: the authorship and authority of digital texts'. *E-Learning and Digital Media*, *3*(1), 16-26.

Berinato, S. (2019). *Good charts workbook: Tips, tools, and exercises for making better data visualizations*. Harvard Business Review Press.

Biggs, J.B. (2003). *Teaching for quality learning at university* (2nd ed.). Open University Press/Society for Research into Higher Education.

Bitzer, L. F. (1968). The rhetorical situation. *Philosophy and Rhetoric*, *1*, 1-14.

Buckingham, D. (2006). Defining digital literacy – What do young people need to know about digital media? *Nordic Journal of Digital Literacy*, *1*, 263-277.

Camgoz, S. M., Tektas, O. O., & Metin, I. (2008). Academic attributional style, self-efficacy and gender: A cross-cultural comparison. *Social Behaviour and Personality: An International Journal*, *36*(1), 97-114.

Cho, K., Schunn, C. D., & Kwon, K. (2007). Learning writing by reviewing in science. *Proceedings of 8th international conference on computer supported collaborative learning*, 141–143.

Cilliers, C. B. (2012). Student perception of academic writing skills activities in a traditional programming course. *Computers & Education*, *58*(4), 1028-1041.

Crossman, J. M. & Kite, S. L. (2012). Facilitating improved writing among students through directed peer review. *Active Learning in Higher Education*, *13*(3), 219–229. https://doi.org/10.1177/1469787412452980

Ennis, R. (2015). Critical thinking: A streamlined conception. In M. Davies et al. (Eds.), *The Palgrave Handbook of Critical Thinking in Higher Education*. Palgrave Macmillan.

Gagich, M. & Zickel, E. (n.d.). *A guide to rhetoric, genre, and success in first-year writing*. Pressbooks. https://pressbooks.ulib.csuohio.edu/csu-fyw-rhetoric/

Gardner, R. C. (1988). Attitudes and motivation. *Annual Review of Applied Linguistics*, *9*, 135–148.

Gore, P. A. (2006). Academic self-efficacy as a predictor of college outcomes: Two incremental validity studies. *Journal of Career Assessment*, *14*(1), 92–115. https://doi.org/10.1177/1069072705281367

Hinrichsen, J. & Coombs, A. (2013). The five resources of critical digital literacy: A framework for curriculum integration. *Research in Learning Technology*, *21*. DOI: https://doi.org/10.3402/rlt.

v21.21334 https://doi.org/10.3402/rlt.v21.21334

Huisman, B., Saab, N., van den Broek, P., & van Driel, J. (2019). The impact of formative peer feedback on higher education students' academic writing: A meta-analysis. *Assessment & Evaluation in Higher Education*, *44*(6), 863-880.

Kember, D., Ho, A. & Hong, C. (2008). The importance of establishing relevance in motivating student learning. *Active Learning in Higher Education*, *9*(249). https://doi.org/10.1177/1469787408095849

Kingkade, T. (2019, March 13). Facebook's privacy shift will make it harder to stop fake news. https://medium.com/news-to-table/facebooks-privacy-shift-will-make-it-harder-to-stop-fake-news-77f401457d00

Lizzio, A. Wilson, K. & Simons, R. (2002). University students' perceptions of the learning environment and academic outcomes: Implications for theory and practice. *Society for Research into Higher Education*. https://doi.org/10.1080/03075070120099359

Lucas, S. E. (2014). *The art of public speaking*. McGraw-Hill.

Minervini, A., Long, L. & Gladd, J. (n.d.). *Write what matters*. Pressbooks. https://idaho.pressbooks.pub/write/front-matter/creative-commons-licensing/

Monroe, A. H. (1935). *Principles and types of speech*. Scott Foresman and Co.

Moran, K. (2020). *How people read online: New and old findings*. https://www.nngroup.com/articles/how-people-read-online/

Ning, H. K. & Downing, K. (2012). Influence of student learning experience on academic performance: The mediator and moderator effects of self-regulation and motivation. *British Educational Research Journal*, *38*(2). DOI: http://dx.doi.org/10.1080/01411926.2010.538468

Pangrazio, L. (2016). Reconceptualising critical digital literacy. *Discourse: Studies in the Cultural Politics of Education*, *37*(2), 163-174. https://doi.org/10.1080/01596306.2014.942836

Paul, R., & Elder, L. (2020). *The Miniature Guide to Critical Thinking Concepts and Tools* (8th ed.). Rowman & Littlefield.

Pachler, N. & Daly, C. (2009). Narrative and learning with Web 2.0 technologies: Towards a research agenda. *Journal of Computer Assisted Learning*, *25*(1), 6-18.

Pernice, K. (2014, December 14). *A link is a promise*. Nielsen Norman Group. https://www.nngroup.com/articles/link-promise/

Pernice, K. (2019, August 4). *The layer-cake pattern of scanning content on the web*. Nielsen Norman Group. https://www.nngroup.com/articles/layer-cake-pattern-scanning/

Ramsden, P. (1991). A performance indicatory of teaching quality in higher education: The Course Experience Questionnaire. *Studies in Higher Education*, *16*, 129–150.

Toulmin, S. E. (1958). *The uses of argument* (Reprint ed.). Cambridge University Press.

Toulmin, S. (2003). *Return to reason*. Harvard University Press.

Wong, T. (2021, July 19). COVID: Is China's vaccine success waning in Asia? *BBC News*. https://www.bbc.com/news/world-asia-57845644

Zuckerberg, M. (2019, March 6). A privacy-focused vision for social networking. *Facebook*. https://about.fb.com/news/2019/03/vision-for-social-networking/

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