Influences of digital checklists on emergent researchers' method designs and writing

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Abstract: This study used writing samples, digital checklists, peer and self-evaluations, and interviews to explore the influences of digital checklists and genre writing instructional strategies on eleven Taiwanese emergent researchers' method designs and writing. This study yielded the following findings. First, digital checklists provided the emergent researchers with step-by-step guidance in writing the method section. Second, genre writing instruction, consisting of the instructor's modelling, explanations, task designs, provision of research projects and guiding questions, accompanied by peer and self-evaluations, facilitated the emergent researchers' awareness and fostered their competence in academic writing.

Keywords: academic writing; digital checklists; emergent research; genre writing instruction; method section.

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1   Introduction

Academic writing is required in different disciplines at the tertiary level. As emergent researchers, undergraduate and graduate students may find writing a research paper challenging, because they have to gain familiarity with the conventions of the academic writing discourse community (Dobakhti, 2016; Hyland and Jiang, 2017; Saeed et al., 2021; Shim, 2005).

Writing instruction should focus not only on the product but also the process (Dimililer et al., 2017; Hoogeveen and van Gelderen, 2015; Negretti and Mežek, 2019; Saeed et al., 2021). Undergraduate and graduate students should seek "rhetorical consciousness raising" [Hyland, (2007), p.13] through exploring essential genre features of academic articles in their disciplines (Cheng, 2008; Shim, 2005). Hence, they can use the knowledge and competence to compose their own texts (Kuteeva, 2013).

The method section of a research paper plays a crucial role. A well-written method section enables the researchers to convince readers of the reliability and the validity of their research (Arsyad, 2013; Lim, 2006). In the method section, researchers are required to describe the design of their methods, provide the rationale behind their decision making regarding such design, and explain how they can enhance the trustworthiness of the data analysis (Ebrahimi and Heng, 2018; Levitt, 2020).

However, it may be challenging for novice or emergent researchers to devise their own research methods. Furthermore, they may lack basic familiarity with the recurrent use of conventional forms of academic writing. Consequently, they may encounter difficulties concerning the content to include and how to organise it (Cotos et al., 2017; Saeed et al., 2021).

Genre writing instruction on method section might be taught among novice second language writers (Cheng, 2008; Cotos et al., 2017; Ghadyani and Tahririan, 2015; Johns, 2011). Integrating technology into writing instruction is the current trend (Carneiro et al., 2017; Dimililer et al., 2017; Jami, 2020; Lidstone and Shield, 2010), the focus of research being on improving English as a foreign language (EFL) learners' academic writing and increasing their genre awareness through technology and digital tools (Soleimani et al., 2019, 2020). This study integrated digital checklists and genre writing instruction with the aim of fostering 11 graduate students' competence in academic writing, particularly in the method designs and writing. These students were enrolled in a graduate school course at a university in northwest Taiwan. This study attempted to address the following questions. First, how did genre analysis writing instruction facilitate the emergent researchers' academic writing in the method section? Second, how did digital checklists assist the emergent researchers' academic writing in the method section? Third, what challenges did the emergent researchers encounter while using digital checklist for self-regulated academic writing learning? Fourth, what were the emergent researchers' perceptions of digital checklists and genre analysis writing instruction?

2   Literature review

Some issues discussed in previous literature include the impact of genre writing pedagogy on academic writing, instructional strategies regarding genre writing pedagogy, and empirical studies of genre writing instruction. Researchers have explored the importance of technology and digital tools on genre writing and empirical studies on using technology on genre writing, particularly the method section. The literature gap was discussed and conceptual frameworks were proposed.

Novice writers can benefit from academic genre writing instruction. First, studying and analysing authentic and discipline-specific texts can enable novice researchers to become familiar with structure and language (Ariyanfar and Mitchell, 2020; Carter et al., 2014; Cotos et al., 2017; Lin and Evans, 2012; Musa et al., 2015; Shim, 2005). Ebrahimi and Heng (2018) analysed twenty method sections of research articles in psychology and chemistry in terms of grammatical subjects. Research-related objects and discourse functions such as 'identify', 'explain' and 'define' were found to be prominent in these articles. The researchers noted that the psychology writers tended to provide elaborate descriptions of the materials due to the characteristics of exploring human phenomena. They concluded that novice writers may benefit from this kind of genre writing instruction, particularly concerning grammatical structure and word choices. Hence,

genre can be regarded as a tool for learning, because emergent researchers can notice the key features of discipline-specific texts. Genre may be a learning tool that helps writers control their structure of academic writing (Cheng, 2008).

Various instructional strategies regarding genre writing pedagogy have been recommended (Cotos et al., 2017; Hartley, 2012; Melles, 2007). First, teachers can adopt different moves of the method section to facilitate novice writers' comprehension of academic articles (Cheng, 2008; Cotos et al., 2017; Li et al., 2020). Scholars have proposed different steps for writing method sections for research articles, such as Swales' (1990) genre analysis, Peacock's (2011) seven-move structure model for research article method sections, and Lim's (2006) three-move and sub-steps on method structure. Arsyad (2013) used Peacock's (2011) model to analyse 51 research articles published mainly in journals in Indonesia, and concluded that they followed linguistic discourse such as passive voice. Li et al. (2020) used audio recordings of classroom instruction, documents, and interviews to explore the impact of two novice English as academic purpose (EAP) teachers' instructional practice on genre-based pedagogy. Rather than inductive and discovery-based genre analysis, these teachers adopted teacher-centered multilayered text analysis by explaining the structure of academic papers and language points.

Second, different types of genre analysis tasks can be employed, and writing tasks should be carefully designed with clear criteria (Cheng, 2008; Rahmat et al., 2019). Kuteeva (2013) integrated the 'examine-and-report-back' genre analysis task into a course undertaken by 32 graduate students in four disciplines: archaeology, history, literature, and media studies. The researchers conducted a qualitative analysis of the participants' tasks and statements of aims, revealing that the graduate learners' analyses were either descriptive or analytical. Learners with better capacity and disciplinary knowledge tended to produce more analytical reports.

Moreover, Nagao (2019) proposed four stages of the genre-based approach to text-based writing lessons, including modelling and deconstructing a text, writing target texts, undertaking a genre analysis of peers' essays, and writing an analysis reflection. Nagao's analysis of 27 Japanese freshmen's genre analysis reflections and essays indicated that the genre-based approach provided macro and micro scaffolding, enabling learners to organise their writing and be aware of the texts' structure.

Empirical studies have been conducted to analyse method sections in different disciplines, including medical (Ghadyani and Tahririan, 2015; Shaw, 2016; Skelton, 1994), engineering (Cheng, 2008; Musa et al., 2015; Nordin et al., 2008), art (Melles, 2007), social sciences (Abdi, 2012; Arsyad, 2013; Ebrahimi and Heng, 2018), and natural sciences (Martínez, 2003; Parkinson, 2011). Abdi (2012) analysed meta-discourse strategies in natural science and social science articles, and found that code closing was employed particularly in method section in social science, because these writers need to clarify procedures and concepts in their research designs.

Some empirical studies explore the structure of the research paper in applied linguistics (Jalilifar et al., 2017; Seifoori and Fattahi, 2014; Yang and Allison, 2003, 2004). It has been shown that researchers in applied linguistics tend to follow an introduction-method-results-discussion framework (Seifoori and Fattahi, 2014; Yang and Allison, 2003).

Other empirical studies of genre writing have focused on comparing and contrasting method sections written by native English speakers and non-native English speakers (Seifoori and Fattahi, 2014; Shim, 2005). Seifoori and Fattahi (2014) compared

20 articles published in applied linguistics written by native English speakers and Iranian researchers in terms of their grammatical complexity, finding that the Iranian writers were able to write texts that were as complex and detailed as those written by their native English-speaking counterparts, although the latter produced more adverb and noun clauses.

The technology and digital tools used in academic writing can be categorised into automated writing evaluation (AWE), automated essay scoring (AES), and the rarer intelligent tutoring systems (IWP) (Allen et al., 2006). Strobl et al. (2019) analysed 44 digital tools in terms of features related to writing processes, pedagogical approaches, feedback modalities and technological specifications, and proposed a taxonomy of online tools for writing support, such as AES and IWP learner prompts and scaffolds. In particular, they aimed to focus on the process-oriented tools that scaffold and prompt emergent researchers' academic writing.

Digital tools are useful in helping emergent researchers to become familiar with the structure of the method section (Schcolnik, 2018). Schcolnik's (2018) survey research focused on 103 Israel writing professionals regarding their use of digital tools for writing. Among the digital tools considered, the most common was used for organising, followed by graphic tools. Adobe Animate was used to teach college students how to write academic essays. Pratama et al.'s (2020) analysis of interviews, documents, and observations revealed that Adobe Animate can provide interactive visual materials during the writing process.

Novice writers can be trained to use flowcharts to clarify their procedures in the method section (Hartley, 2012). The Student's Academic Literacy Tool (SALT) project has proven to be a useful tool for enabling academic writers to recognise the characteristics of academic writing in terms of grammatical accuracy, correct use of language, structure and development of text, and use of relevant source materials (Becker et al., 2016). Similarly, Nordin et al. (2008) proposed a framework for using virtual reality (VR) to help engineering students with technical writing. Indeed, VR can be used to enable learners to collect relevant information and to use it for writing a report through classroom activities such as planning, drafting, and publishing.

Digital tools are mostly used in the process of writing instruction in the form of feedback, such as assessment (Ebadi and Rahimi, 2019; Liu et al., 2012; Zakaria and Hashim, 2020), peer assessment (Lan and Chao, 2013), self-correction (e.g., Khoshnevisan, 2019; Tacoamán Portilla, 2019), and scaffolding patterns (Ebadi and Rahimi, 2019; Lin et al., 2020; Raedts et al., 2017; Soleimani et al., 2019, 2020). Zakaria and Hashim (2020) integrated Kahoot as a game-based assessment tool into a university academic writing game with 35 Malaysian pre-service teachers. The qualitative thematic analysis of the focus group discussions revealed that the teachers regarded Kahoot as a systematic and interesting form of game-based assessment.

In addition, Liu et al. (2012) created an automatic question generation (AQG) system called G-Asks to analyse 33 engineering graduate students' research proposals, particularly focused on the literature review. The researchers' analysis of online systems and interviews revealed that both the graduate students and their supervisors regarded G-Asks as useful in identifying grammatical and semantic errors in the proposals. Furthermore, Khoshnevisan (2019) explored the influence of Grammarly as an AWE tool on four international students' writing. Khoshnevisan's analysis of questionnaires and interviews indicated that Grammarly helped the learners improve their writing skills and produce more accurate essays.

Some studies have explored the influence of digital tools on genre structure for academic writing (e.g., Lin et al., 2020; Mizumoto et al., 2017; Soleimani et al., 2020; Sun, 2007). Mizumoto et al. (2017) designed AWSuM, an academic word suggestion machine, consisting of genre-based writing with rhetorical moves and lexical bundles. Similarly, Sun (2007) designed the scholarly writing template (SWT) to guide graduate students in developing their content for their academic paper with the discipline-specific corpus and concordance. Sun's analysis of questionnaires and interviews with 20 Taiwanese graduate students indicated that the SWT increased graduate students' awareness of genre-specific lexicon-structural regulations and idea development.

Soleimani et al. (2019, 2020) compared and contrasted the influence of augmented reality (AR), VR, and the traditional way of collective scaffolding patterns among 24 Iranian intermediate learners on abstract genre structure. Following Hyland's (2007) move, the AR group demonstrated a peer-to-peer scaffolding pattern, the VR group demonstrated a multi-directional pattern, and the traditional group employed an individual scaffolding pattern. Correspondingly, Lin et al. (2020) compared the influence of AR-based context-aware writing and mobile-assisted classroom-based writing on Taiwanese sophomores' genre-based writing outcomes, and their perceptions. The researchers' analysis of pre- and post-tests, concept maps, interviews, and process writing essays revealed that AR-based context-aware writing facilitated the sophomores' self-regulated learning of genre.

The method section has received less attention than other sections of an academic paper (Ebrahimi and Heng, 2018). Recent empirical studies have explored the effects of researchers' generated learning platforms on learners' academic writing, such as Mizumoto et al.'s (2017) AWSuM, Sun's (2007) SWT, and Liu et al.'s (2012) AQG. However, not all emergent researchers have access to these learning platforms. In response, this study aimed to explore 11 graduate students' use of digital checklist tools as self-regulated learning for academic writing.

Figure 1   Conceptual framework (see online version for colours)
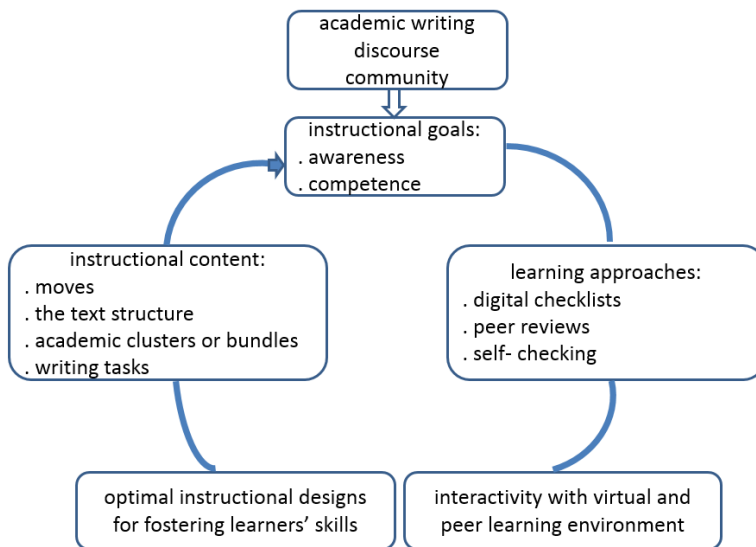
The conceptual framework shown in Figure 1 was developed based on previous empirical studies (e.g., Carneiro and Oliveira, 2017; Lievens, 2018; Lin et al., 2020; Nordin et al., 2008; Turmudi, 2020). In order to prepare graduate students to become involved in the academic writing discourse community, the study's two major instructional goals were to foster first the students' awareness of genre structure and second their competence. In order to provide optimal instructional designs for improving learners' skills in academic writing, instructional contents were introduced to participants including moves, text structure, academic clusters, and diverse writing tasks. Participants were scaffolded to use digital checklists and conduct peer reviews and self-checking during the writing process, so that they could interact with virtual and peer learning environments.

3   Method

Case study designs allow researchers to investigate a natural phenomenon within a single bounded system through detailed and in-depth data collection (Creswell, 2007; Merriam, 2002). This case study focused on 11 graduate students' academic writing in a course as the bounded system. These participants as multi-cases were used to compare and contrast the influence of digital checklists and genre writing instruction on their method section writing. Data triangulation (writing samples, interviews, digital checklists, peer reviews) deepened the analysis and enhanced the transferability of the study's findings to other academic writing courses as settings.

3.1   Participants and setting

The participants in this study comprised 11 graduate students enrolled in an elective course called qualitative research method, offered as part of a language teacher education program in northwest Taiwan. The main goal of this course was to provide the graduate students with a basic overview of qualitative research in language teaching, increasing their familiarity with the purpose, design, and procedure of research.

Table 1   Participants' demography

Names	Nationality	Major	English proficiency levels
Alice	Taiwan	Learning science and technology	CEFR C1
Betty	Taiwan	English education	CEFR B2
Cindy	Taiwan	English education	CEFR C1
Daisy	Taiwan	English education	CEFR B2
Emily	Taiwan	English education	CEFR B2
Joyce	Taiwan	English education	CEFR B2
Kelly	Malaysian	education and learning technology	CEFR C1
Nancy	Indonesia	education and learning technology	CEFR B2
Oscar	Indonesia	mathematics and science education	CEFR B2
Peter	Indonesia	education and learning technology	CEFR B2
Simon	Indonesia	education and learning technology	CEFR B2

Participants were recruited voluntarily based on convenience sampling, because data were to be collected based on the availability of the research site and participants (Merriam, 2012). The participants were informed of the research study and were asked to fill in their consent form on the first day of the 2021 spring semester. All of the names presented in this study are pseudonyms. The participants' demographic data are shown in Table 1. More than 55% of the participants were Taiwanese, followed by Indonesians (n = 4, 36%) and Malaysians (n = 1, 9%). More than 45% of them were majoring in English education (n = 5, 45%), followed by education and learning technology (n = 4, 36%). Their English proficiency ranged from B2 'vantage' (according to the Common European Framework of Reference for Language) to C1 'effective operational proficiency'.

3.2   *Teaching procedure*

Dr. Anderson, the instructor of qualitative research method, first introduced the structure of the method section based on different scholars' move structure (e.g., Arsyad, 2013; Becker et al., 2016; Lim, 2006; Peacock, 2011; Swale, 1990). The characteristics of different types of qualitative research methods were introduced, such as case study, content analysis, and narrative inquiry. Academic clusters or bundles were taught, such as 'the study set the context of' and 'the thematic analysis was employed'.

The participants were guided to read journal articles related to their research interests, identify the move, and circle academic clusters. They were asked to use digital checklists to outline their method section for different types of qualitative research methods. Based on their chosen outline and exemplary journal articles, the participants wrote their method sections. They were then asked to peer review their method sections in terms of structure.

3.3   *Data collection*

Data were collected through writing samples, digital checklists, peer and self-evaluations, and interviews. Documents are unobtrusive and can furnish descriptive information and track learners' change and development (Merriam, 2012). First, the participants were asked to write three writing samples regarding the method section for case study, content analysis, and narrative inquiry. The digital checklists that the participants used to structure their method sections were collected for subsequent analysis, too.

The participants were asked to comment on their own and their classmates' method sections. Guiding questions were provided for self- and peer evaluations, such as 'Did you or your classmates include all the important elements in this case study assignment?' and 'What elements did you/he/she miss?'

Semi-structured informant interviews were conducted at the end of the study. The interview protocol was constructed based on previous empirical studies (e.g., Ebadi and Rahimi, 2019; Negretti and Mežek, 2019; Shaw, 2016) and consisted of two parts. The first part was used to explore the participants' attitudes toward genre writing instruction, while the second part was used to gather their perceptions of using digital checklist tools. Each interview lasted from 30 to 60 minutes, and was recorded for later transcription and analysis.

The interview data were first transcribed for analysis. The thematic analysis was employed following these steps. First, the researcher read through the data several times

and assigned tentative codes (e.g., research design, data collection, modelling). Second, these tentative codes were clustered into categories (e.g., perceptions, attitudes, challenges, strategies). Third, based on the conceptual framework and the research questions, these categories were merged into major themes (e.g., genre writing instruction, digital checklists). The tentative data analysis was submitted to the researcher's faculty for peer review to ensure its trustworthiness.

4   Results

Based on the analysis of writing samples, digital checklists, peer and self-evaluations, and interviews, the participants' perceptions of elements in the method section, their writing of the method section, the challenges they faced when writing the method section, their attitudes toward genre analysis writing instruction, and their learning records on the digital checklists, were all discussed.

4.1   *Participants' perceptions of elements in the method section*

The participants held more accurate perceptions of case study (n = 5) than content analysis (n = 4) and narrative inquiry (n = 3). They clearly described the important elements of each method as follows:

- Research design, subject, data collection procedure, instrument, and data analysis (self-perception, case study 01).

- The most important elements are participants, choosing content for analysis, data collection, and data analysis (self-perception, content analysis 01).

- The most important elements in the method section: rationale for method design, how to recruit participants, data collection, and data analysis (self-perception, narrative inquiry 01).

Over 20% of the participants' perceptions of the method section were accurate. Their knowledge of the method section was in accordance with the current move of the method section required by the academic discourse community, including describing the participants, the measures or the instruments used, the procedures of data collection, and the analysis employed (Hartley, 2012).

However, the participants did not provide complete descriptions of the elements in each method, such as 'data collection and data analysis' for case study, 'data collection, data analysis, and procedure' for content analysis, and 'collecting and analysing the data' for narrative inquiry. A few even provided incorrect responses, particularly with respect to content analysis and narrative inquiry, as follows:

- The messages that the researcher wants to tell the readers (self-perception, content analysis 02).

- The most important element in the method section is how to code the data in each category (self-perception, narrative inquiry 02).

When asked to provide the elements to be included in the method section for case study, content analysis and narrative inquiry, the participants wrote the features of each method,

such as 'The most important are the triangulation part and the bounded system' for case study, 'The material the researcher chooses' for content analysis, and 'The analysis of the interviews' for narrative inquiry.

4.2 Participants' writing of the method section

As shown in Table 2, regardless of type of research method and evaluations, the part that was rated the best was 'participants and setting', followed by 'data collection' and 'data analysis'. The 11 participants clearly knew the details (e.g., participants, location) of their thesis field work. For instance, Kelly wrote in her self-reflection that 'I included all these elements in my assignment including: research questions, context, textbook selection, data collection and data analysis. I know I will analyse textbooks from my own country'.

Table 2   Participants' writing in method section

	Case study			Content analysis			Narrative inquiry		
	Instructor	*Self*	*Peer*	*Instructor*	*Self*	*Peer*	*Instructor*	*Self*	*Peer*
Type and features	3	4	4	4	4	4	6	6	6
Participants	9	9	9	10	10	10	8	8	8
Data collection	8	8	8	8	8	8	8	8	8
Data analysis	6	6	6	6	7	7	6	7	7

Academic writers such as Kelly should be equipped with competence, so their method section must be written in a clear, well-organised, and comprehensive manner. The method section should convince readers that the researcher can effectively represent the groups involved (Arsyad, 2013).

Figure 2 was Kelly's method section on content analysis. She clearly described a public university in Vietnam as her research context, and provided detailed descriptions in terms of courses, course objectives, and requirements. Moreover, she described three coursebooks chosen for her content analysis.

Academic writers such as Kelly should clearly explain the individuals involved or the objects used in their research for the purpose of data collection. Moreover, they need to describe the area where the research will take place, and explain this choice (Arsyad, 2013).

The area of the method section that the participants failed to clearly describe was 'type and features', particularly in the case study (n = 3 for projects, n = 4 for self- and peer evaluations). The participants did much better in describing type and features in narrative inquiry than case study and content analysis. For example, Betty wrote the following in her self-reflection: 'I did not list features of my content analysis'. Oscar also wrote in the peer reflection that 'Some of my peers missed the features of each research method and the descriptions of the research method employed in their research project'.

The above-mentioned participants did not clearly state the rationale behind their decisions in the method section. In order to clearly demonstrate their competence in conducting the research project, emergent researchers as academic writers should learn to be transparent in stating the features of their research method and in providing their rationale behind employing a specific research method (Arsyad, 2013; Levitt, 2020).

Figure 2   Kelly's writing exercise on content analysis

Context

This study is conducted at a public university in Ho Chi Minh City, Vietnam. In Vietnam, at tertiary education, English textbooks are not compiled by institutes assigned by government but from native-speaking countries, and universities are entitled to select coursebooks that are suitable with the curriculum and the school objectives. In the context of the university where this study is conducted, undergraduate non-English major students are required to take totally six English courses to obtain 18 credits. The aims of these courses are to strengthen proficiency and fluency in four skills (listening, speaking, reading and writing), boost students' confidence and prepare them for the English test as a requirement for graduation.

Textbook selection

Three coursebooks chosen for analysis are *Four corners 2* (A2 level) used for English 1 & 2, *Four corners 3* (B1 level) used for English 3 & 4, *American Headway 4* (B2 level) used for English 5 & 6. Each collection includes teacher's book, student's book and workbook. In the scope of this study, however, only student's book is chosen for analyzing due to the fact that teacher's book merely contains guiding instructions while workbook is not regularly used by students. Regarding *Four corners* series, there are 12 units in each book, and each unit contains four smaller parts which cover Grammar, Vocabulary, Functional language, Listening and Pronunciation, Reading and Writing, Speaking. In *American Headway* series, each book comprises 12 units; each unit contains seven components namely Grammar, Vocabulary, Everyday English, Reading, Listening, Writing and Speaking. For the purpose of this study, only the reading sections are examined. All the books are published by international publishers and distributed worldwide. They are widely-used in numerous universities in Vietnam and all over the world.

Figure 3 presents Betty's method section for content analysis. Betty claimed to use content analysis, but she did not describe its features and explain why her study fit them. Rather, she merely described definitions of blended learning. Novice academic writers such as Betty lack basic familiarity with the use of conventional academic writing discourse, and have difficulties in organising the method section (Cotos et al., 2017).

Overall, many of the elements of the writing projects rated and identified by the instructor, the participants and their peers were consistent, particularly 'participants and setting' and 'data collection'. However, others were inconsistent, especially 'type and features' and 'data analysis'. The participants and their peers rated their writing samples with much higher scores than their instructor. For instance, Joyce wrote in her self-reflection that 'I am proud of myself that I have understood another research method, this could help me in conducting my future research'. Emily also wrote in her self-reflection that 'I follow the structure base on the exemplary thesis so the structure of my writing is fairly clear. I also use the digital checklist to outline my assignment'.

Novice academic writers such as Emily and Joyce may believe that they are adopting the move of the method section, and that their writing thus fulfils its communicative

purpose. On the other hand, academic writer instructors may perceive that their students need to articulate aspects of their methods more clearly (Cotos et al., 2017).

Figure 3   Betty's method on content analysis

> **Method**
>
> This study followed the content analysis method, which is commonly used for textual analyses and allows for comparing, contrasting, and categorising the data (Fraenkel & Wallen, 2000). Blended learning (BL), defined as the thoughtful integration of face-to-face (FtF) and online learning experiences (Garrison & Kanuka, 2004). Yoon and Lee (2010, p. 180) defined blended learning as 'bringing together the positive attributes of online and offline education, including instructional modalities, delivery methods, learning tools, etc., in relation to language teaching and learning approaches and methods in order to reinforce the learning process, to bring about the optimal learner achievement, and to enhance the quality of teaching and learning'. Therefore, this study will investigate the information on the trends of blended learning of reading skills in English language learning.

4.3   Challenges participants faced when writing the method section

The biggest challenges the participants faced when writing their method sections pertained to 'data analysis' (n = 6), followed by 'procedure' (n = 3), and 'data collection' (n = 2). For example, Oscar said that 'I think I do not fully understand what the data analysis process is, so I have some difficulty in writing the data analysis section'. Furthermore, Emily wrote that 'I have difficulty in determining how to properly analyse the data'. Betty also responded in interview that 'The most difficult parts for me are in the data analysis section when I have to describe how I analyse data based on theory, and the coding process, which is quite technical'.

Moreover, the participants were unsure about the procedure in data collection and in determining what data to collect. Joyce struggled with the narrative inquiry design, saying: 'Design my own narrative inquiry, especially the instrument part. When there are several problems, how can I narrow them down?' In addition, Cindy said, 'decide the topic and the procedure on data collection', while Daisy said, 'design the procedure in the methodology section'.

The challenges identified by emergent researchers such as Joyce, Cindy and Daisy are consistent with previous empirical studies (Cotos et al., 2017). Novice academic writers may struggle to organise and structure their method section with substantial evidence (Cotos et al., 2017).

4.4 *Participants' attitudes toward genre analysis writing instruction*

Overall, the participants held positive attitudes toward genre analysis writing instruction in terms of the instructor's writing modelling (n = 9), explanations and PowerPoints on research methods (n = 8), task designs for writing exercises (n = 5), provision of research projects (n = 4), and use of guiding questions (n = 3).

The participants' positive attitudes toward genre analysis writing instruction implied that instructors should guide learners to identify the structural and linguistic characteristics of the method section for different research methods through various instructional strategies, approaches, or tasks. Such instruction may facilitate learners to understand the academic discourse community, and enable them to become better and more confident writers (Ariyanfar and Mitchell, 2020; Ebadi and Rahimi, 2019; Shim, 2005).

Figure 4   The instructor's modelling

With regard to the instructor's writing modelling, Peter said, 'I take advantages of the Prof.'s modelling on checklists to help me have a clear outline from the beginning and not miss a deadline'. Simon also said in the interview, 'It was really helpful to me. While I was writing my research design, I checked the instructor's modelling, so I was able to follow the flow or steps of writing a case study and things that must be considered in writing a case study'. Figure 4 presents the instructor's modelling, which clearly outlines the method section in terms of the types of research methods, participants and setting, data collection, data analysis, and self-checking (e.g., grammar checking, APA).

The pedagogical value of the instructors' modelling can have implications for teaching academic writing in tertiary education (Melles, 2007). Modelling as the explicit

form of genre analysis writing instruction can have a positive and direct effect on learners' writing performance (Li et al., 2020; Melles, 2007; Nagao, 2019; Raedts et al., 2017). Academic writing instructors' content knowledge of the academic genre enables them to provide their learners with step-by-step modelling and instruction, so the latter can become more aware of the features of the method section (Li et al., 2020; Nagao, 2019).

Moreover, the participants regarded the instructor's explanations and PowerPoint slides as useful in supporting their method writing. For instance, Kelly said, 'I was greatly helped by the professor's explanation. With the PowerPoint, explanation, and writing exercise, I can improve my writing competencies'. Furthermore, Nancy said, 'The lecturer's PowerPoint slides assisted me in reviewing the important aspects of research design'. Figure 5 shows the instructor's PowerPoint slide on case study, specifically regarding the bounded system and unit of analysis.

Figure 5   The instructor's powerpoint slide on case study
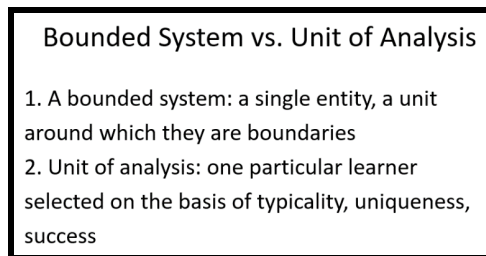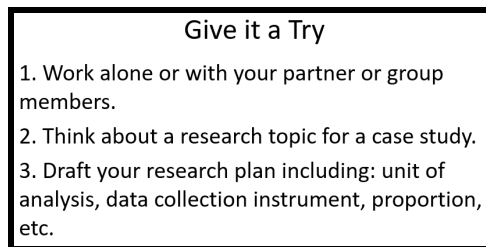

Figure 6   Writing task on case study

The instructor's PowerPoint slide on genre analysis writing in Figure 6 focused on identifying the strengths of a case study. Teacher-centred genre analysis writing instruction can give weight to explanations and awareness-raising of the method section (Li et al., 2020).

The participants claimed that they benefited from the instructor's task designs for writing exercises. For instance, Daisy said, 'The activities are useful in preparing for the assignment and for thesis writing', while Simon said, 'These class activities are helpful for me in knowing the features of each method, so that when I come to think about the topic of my own research, I will be able to know which method will be most appropriate to use'. Figure 6 presents the instructor's task design on case study. The participants were asked to draft their research plan, including the unit of analysis, the data collection, and instrument.

Task-based writing tasks can provide novice academic writers with opportunities to practice writing the method section. Such task-based writing tasks can be properly designed and built into courses, so that authentic learning experiences can engage and enable novice academic writers to increase their familiarity with academic genre structure under academic writing instructors' guidance (Ariyanfar and Mitchell, 2020; Li et al., 2020; Nagao, 2019).

Betty said, 'The board game chart helps me to focus on the key elements of research design'. Figure 7 presents the instructor's board game, which the learners used to review the key terms in a case study, such as bounded system, triangulation, and generalisation. The participants threw the die and explained the term based on the number revealed.

Figure 7   Racing to the goal board game (see online version for colours)

This board game helped participants such as Betty become familiar with the academic writing terms on research designs. Academic writing instructors can create a game-based learning environment, because such a learning environment enables emergent researchers to process information regarding academic writing (Zakaria and Hashim, 2020).

During the course, the instructor also shared her own research project, and participants considered its usefulness. For instance, Alice said, 'The examples of teachers help me to do my own research', while Peter said, 'The structure of the instructor's academic writing gives me an outline to follow'. Figure 8 presents the instructor's PowerPoint slide on the research project, specifically research method designs in terms of participants and setting, method and data collection, and analysis of quantitative and qualitative data.

Genre writing classes on the method section can be designed around the explicit examples as revealed in Figure 8, so emergent researchers' awareness of overall organisations on the method section, linguistic features, and communicative purposes can be increased. Hence, they can understand and master the academic discourse widely acknowledged by the teaching English to speakers of other languages (TESOL) field (Ariyanfar and Mitchell, 2020; Yang and Allison, 2004).

Figure 8 The instructor's research project (see online version for colours)
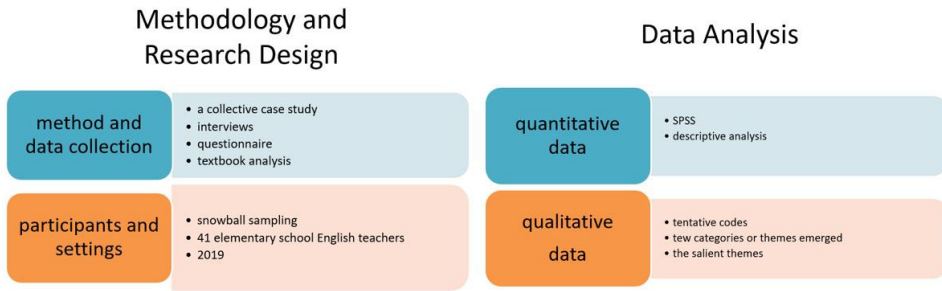
Finally, the instructor's guiding questions facilitated participants' method writing and critique. For instance, Cindy said, 'The guiding question on study analysis did help me a lot in the critique part. Especially, I'm an over-thinker, and when I don't have direction, it's easy for me to do things wrong'. Figure 9 displays the instructor's guiding questions that participants can use to analyse the narrative inquiry designs used in journal articles in terms of participant recruitment, research design, data collection, and data analysis.

Figure 9 Instructor's guiding questions
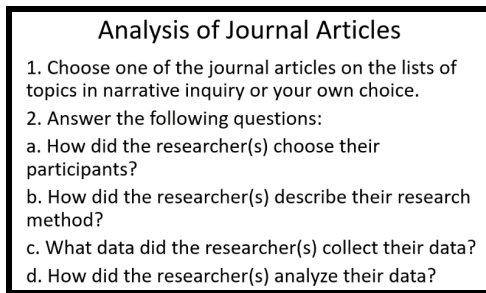
Via genre analysis writing instruction, novice academic writers are enabled to analyse exemplary journal articles through guiding questions, and thereby explore the functions, organisation and linguistic features of the method sections of different research methods, as in Figure 9. As a result, they can become aware of the structural elements (Ariyanfar and Mitchell, 2020; Nagao, 2019).

4.5   Learning records and facilitation of digital checklists

Digital checklists facilitated participants' method section writing in terms of structure organisation and self-checking. First, digital checklists provided participants with a structure to follow. For instance, Alice said, 'It gave me the whole structure and steps before doing the assignment. I just needed to follow the checklist step by step'. Furthermore, Kelly said, 'It aligns what should be included in the writing with the actual writing. Before the compilation of the writing, it gives me an initial structure. After the completion of writing, it serves as a reminder for me to include all the important points'. Figure 10 displays Kelly's digital checklist; all the steps are listed with the applicable deadline. The effects of digital checklists on the academic writing of emergent researchers such as Kelly have been affirmed by previous empirical studies (e.g., Becker

et al., 2016). Digital checklists consist of criteria designed to enable academic writers to identify the key features of the method section and to assess whether they have met each of the criteria (Becker et al., 2016).

Figure 10   Kelly's digital checklist (see online version for colours)
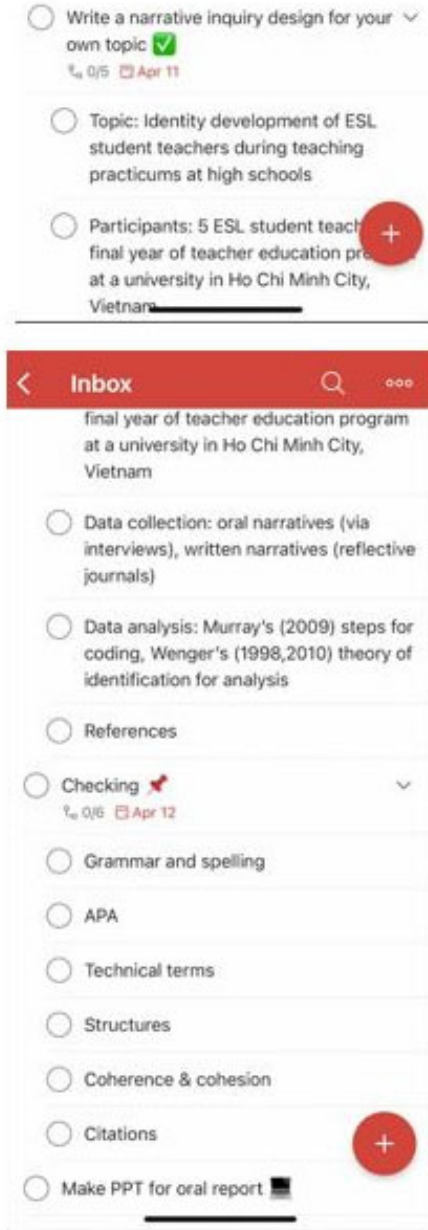
Second, digital checklists helped participants to do self-checking. For example, Alice said, 'I still make use of checklist app on my phone to write down the outline for my

assignment, and stick to it step by step. It also helps me to check if I am missing any sections'. Furthermore, Nancy said, 'It kept me on track of the writing focus and it reminded me to include all the main points'. Figure 11 displays Nancy's digital checklist on content analysis, which includes research questions, data collection, and data analysis. However, the coding scheme should be placed under data analysis rather than data collection.

Figure 11 Nancy's digital checklist

Content Analysis Research

- [ ] Title : Content Analysis of the Diagrammatic Representations of Primary Science Textbooks
- [ ] Summary and Research Questions
- [ ] Data Collection:
- [ ] - Sample
- [ ] - Coding Scheme
- [ ] Data Analysis:
- [ ] - Systematic Coding
- [ ] - Categorizing of the diagrams, drawings, charts and photos
- [ ] - Statistics Method
- [ ] Critique
- [ ] Grammarly Checked
- [ ] APA

Digital checklists can be considered a useful device for emergent researchers such as Alice and Nancy, because they help them clarify the procedure, like through a flowchart. Such digital checklists can support academic writers' autonomy and self-regulated learning in academic writing (Hartley, 2012; Strobl et al., 2019).

5 Discussion

This study used writing samples, digital checklists, peer and self-evaluations, and interviews to explore the influences of digital checklists and genre writing instructional strategies on 11 emergent researchers' method designs and writing. Based on the conceptual framework presented in Figure 1, this study yielded the following findings.

First, in response to the first research question, the instructor's genre writing instruction, including reading exemplary journal articles, conducting an analysis of these

articles, modelling, following PowerPoint slides on the features on research methods, undertaking writing tasks, playing board games, and answering guiding questions, facilitated the emergent researchers' familiarity with the academic writing discourse community. The effectiveness of genre writing instruction identified here is consistent with previous empirical studies (e.g., Ariyanfar and Mitchell, 2020; Nagao, 2019). Explicit instruction can help learners become aware of the structure, organisation, and linguistic features of the method section through analysing exemplary texts, following an instructor's modelling, and independently constructing a manuscript.

Moreover, self- and peer evaluations enabled the participants to examine their own and their peers' writing, and become aware of the academic genre. Appropriate assessment criteria and feedback from peers can help novice academic writers reflect upon their own writing and improve its quality (Hoogeveen and van Gelderen, 2015; Kuteeva, 2013; Lan and Chao, 2013; Nagao, 2019). Self- and peer evaluations can be used as self-regulated learning strategies and metacognitive scaffolding, potentially increasing learners' knowledge of the genre features of academic writing (Lin et al., 2020; Negretti and Mežek, 2019).

Secondly, regarding to the second research question, digital checklists provided the participants with guidance on method section writing, by offering a step-by-step structure that they could follow. Instructors of academic writing must use technology as a tool to facilitate digital natives' academic writing competence. Such finding is supported by the empirical studies (Carneiro and Oliveira, 2017; Dimililer et al., 2017) that technology can foster novice academic writers' self-regulated learning and cooperative and collaborative learning.

Regarding to the third research question, a gap was observed between the emergent researchers' awareness of academic writing and their competence. The participants were aware of the structure of the method section for three research types, but they failed to describe the features of the research types and to explain the research method they employed in their writing samples. They also regarded the procedure for data collection and data analysis as challenging when writing the method section.

This finding is accord with the empirical studies (Cotos et al., 2017; Saeed et al., 2021) that such a gap may be closely related to emergent researchers' insufficient knowledge and competence of disciplinary discourses and knowledge-making practice in TESOL and applied linguistics. Novice academic writers should be made aware of genre through comparing and contrasting the method sections of different methods. Indeed, such instruction can help underscore the connection between the intended purposes of the method section and disciplinary knowledge-making practice (Kuteeva, 2013).

Fourth, participants held positive attitudes toward genre writing instruction and digital checklists. Improving novice academic writers' genre awareness has been the focus of many researchers and practitioners in academic writing at the tertiary level. Technology-enhanced language learning can be used to achieve this instructional goal for academic writing proficiency and literacy (Mizumoto et al., 2017; Nagao, 2019; Soleimani et al., 2019). Academic writers may use a variety of tools in all stages of the writing process, such as brainstorming, researching, taking notes, outlining, citing, rewriting, and revising. Digital checklists can be used by academic writers to organise their ideas and improve their metacognitive knowledge under genre analysis writing instruction (Lin et al., 2020; Schcolnik, 2018).

6 Implications

Four suggestions can be offered for academic writing educators to effectively design genre writing instructional strategies for emergent researchers. First, genre writing instruction should be included in academic writing courses for emergent researchers as academic writers. Genre writing instruction can provide a useful framework for new members in the academic discourse community, because academic writing instructors can introduce novice academic writers to the patterns and conventions of academic discourse (Abdi, 2012; Kuteeva, 2013; Li et al., 2020). Hence, novice academic writers can be exposed to the common structures and linguistic features of the method section required for their academic writing, and learn to express their own voice through academic writing (Abdi, 2012; Mizumoto et al., 2017).

Second, emergent researchers should be exposed to a rich body of exemplary academic journal articles, so that they can become aware of the academic writing discourse. Exemplars of the method section from journal articles can exhibit various patterns of similarity in terms of structure, style, content, and readers (Ariyanfar and Mitchell, 2020). Studying exemplars of a given genre can provide emergent researchers with guidelines on how to construct texts and identify moves and features in the method section (Carneiro and Oliveira, 2017; Clark, 2005).

Third, an academic writing learning environment such as academic writing workshops can be designed for emergent researchers in order to help them interact with instructors, peers or other researchers in the academic discourse community. Collaborative writing can be fostered in this academic discourse community, allowing emergent researchers to learn from each other, with the instructor as the guide or mentor (Carneiro and Oliveira, 2017; Dimililer et al., 2017; Ebadi and Rahimi, 2019; Soleimani et al., 2020). Such interactions can help emergent researchers to articulate and discuss issues in their academic writing through engaging in a step-by-step process, starting from method selections or instrument construction (Jami, 2020; Negretti and Mežek, 2019; Saeed et al., 2021). Such an academic writing learning environment should seek to help emergent researchers to write the method section for different research methods in accordance with the conventions of the discourse community (Dobakhti, 2016; Ghadyani and Tahririan, 2015; Nordin et al., 2008). Hence, emergent researchers can prepare themselves for their future professional discourse community (Dobakhti, 2016; Nordin et al., 2008).

Fourth, a corpus-derived platform on academic writing should be designed for emergent researchers, which they can use to scan through manuscripts and be informed of missing or inappropriate elements in the method section (Cotos et al., 2017; Mizumoto et al., 2017). Such a platform, developed based on genre-specific lexicon-structural regulations, can serve as a valuable source for emergent researchers to reflect on and revise their method section. Emergent researchers can spend more time and effort on the content by checking and modifying it, structures, and language (Sun, 2007). Such a method section can be grounded in its credibility, clarity, and precision (Cotos et al., 2017; Ghadyani and Tahririan, 2015), and emergent researchers' scholarly writing can become more effective (Sun, 2007).

7   Conclusions

This study analysed writing samples, digital checklists, peer and self-evaluations, and interviews to explore the influences of digital checklists and genre writing instructional strategies on 11 emergent researchers' method designs. This study reached two major findings. First, digital checklists provided the emergent researchers with step-by-step guidance in writing the method section. Second, genre writing instruction, consisting of the instructor's modelling, explanations, task designs, provision of research projects and guiding questions, accompanied by peer and self-evaluations, facilitated the emergent researchers' awareness and fostered their competence in academic writing.

The contribution of the study is twofold to the growing trend of genre writing pedagogy and research. First, digital checklists can appeal to researchers and practitioners in the technology-enhanced language learning field of research and academic writing. Moreover, the framework presented in Figure 1 and the four suggestions proposed by this study can provide pedagogical implications for practitioners and instructors of academic writers in scaffolding their novice academic writers to write their method section.

This study had two major limitations. The first was the number of participants, comprising only 11 graduate students enrolled in a course. The second was the study's sole focus on the method section. The limitation of the academic writing on the method section did not allow for the exploration of the relationships on the influence of digital checklists on learners' overall academic writing performance. A future study should explore and address the research question 'How will the integration of technology-enhanced learning tools as self-regulated learning and checking foster novice researchers' competence in academic writing, particularly research proposal or thesis writing'?

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