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Research Article

4AA Model as a Task-based Research Writing Framework for Undergraduates

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ABSTRACT

Writing as an intellectual enterprise does not have to be performed individually; it is supposed to be a collaborative activity. Adopting the principles of the self-efficacy theory, community of inquiry framework, and collaborative learning framework, this study proposed a task-based approach known as 4AA Model for writing the results and discussion section of a technical paper written in the IMRAD Format. Using an exploratory mixed method design (i.e. developmental and survey) during the first semester of school year 2021-2022, the participants as end-users of the model (n=80, HEI faculty and students) claimed, based on the survey results, that the model could be used in the teaching of writing in college. Further, majority rated the model as practical and its attributes are doable. When asked their ability to perform the indicators covered in the Model, the participants registered means of 'moderate ability', with the HEI faculty reporting higher weighted means. On the 4AA Model structure, the competencies for the 3rd-author are rated the most difficult while those of the 1st-author are rated the easiest. Moderate abilities of the participants were perceived for the 2nd-author type. The researchers conclude that the 4AA Model could be used in the teaching of research subjects in college, and a training manual based on the perceived abilities of the participants is recommended.

KEYWORDS

4AA Model, Educational Technology, Higher Education, Technical Writing

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INTRODUCTION

Humanity has progressed because our ancestors were able to communicate in written languages the wisdom of their generation. The human life has improved because science has continuously searched for ways and means to make life easier, and these innovations are in written form for consumption by this generation and the next generations thereafter. The need for written communication is so essential that everything could be meaningless and not valid if it is merely verbally given. Thus, the importance of writing concise written report is indispensable to nation-building and community empowerment.

Technically, the need to prepare a written document (Flora & De Vera, 2019) of all types begins in college. It is therefore very necessary that college students are trained and learned in written communication. Much more necessary is that they are trained and learned in being able to transmit technical information in a structure that professionals and non-professionals would be able to understand. During these contemporary times, the most accepted structure for written communication is the IMRAD Format, which is short for Introduction, Methods, Results and Discussion and could be performed by students (Solikhah, Tarman & Budiharso, 2022). Even up to this time, it is true that preparing a manuscript or a technical report is not an easy task and it is difficult to write well (Kang & Kim, 2022), and in fact, the pressure to produce high-quality writing is not matched with the training necessary to succeed as a professional writer (Schuhart, 2014) and despite this need to write technical reports by college students, the undergraduate curricula are viewed to be severely lacking (Lampert & Pearson, 2021) of these topics.

It appears that there is a structure or format that could be used as pattern in academic and technical writing (Kurniawan et al., 2019; Camara & Ventayen, 2020) but this is not well-established in the curricula currently being implemented (Lampert & Pearson, 2021) in the tertiary level, and if indeed it is integrated, it is observed that less efforts for appropriate training were executed because, for one, the teacher does not touch this topic (Solikhah, Tarman & Budiharso, 2022) because it takes up so much time which could be used to deliver content topics instead or they also do not have the necessary trainings. Despite this, instructors are encouraged to design long-term collaborative research and writing projects that mimics, as closely as possible, the communication challenges of (Schuhart, 2014) professionals and non-professionals, as writers. For students, they must learn to write in a team-based, collaborative environment that requires effective project management (Martini, 2021), with and for audiences outside the 'universities' and in genres that are intended for use beyond the classroom (Martini, 2021).

In the case of the Philippines, senior high school students receive formal classroom instruction on qualitative and quantitative research, for Grades 11 and 12, respectively and are generally 'satisfied' with the instruction they received (Guinto et al., 2021), regardless of the strand they are enrolled in. A quick survey on the basic education curriculum in the Philippines, however, revealed no definite model approach on how these subjects will be taught other than the usual 'traditional' way (i.e. teaching sections of a research paper one at a time) and, in fact, the K-to-12 graduates surveyed who were college students at the time of data-collection are equally divided whether the K to 12 curriculum helped prepare them in college or not (Camara, 2020). Obviously, 'teaching' the content of a research subject is easy and could even be developed (Camara, 2018) but requiring a full-blown research output after an average of five (5) months per semester, in either basic or higher education, is a different story. In a study conducted among 1, 250 respondents, around 2% of college students in the Philippines reported of not being able to write a thesis in senior high school, nor defend it individually or even in groups (Camara et al., 2020), despite them considering themselves (i.e. either female or male) as 'Highly Competent' in their research knowledge (Camara, 2021b). Thus, this cohort of students, when they go to college, need further research instruction.

The paper of Camara et al. (2020) contained the first mention of the 4AA Model as a proposed policy framework for pre-college research in the Philippines to manage the implementation of research subjects for senior high school (n=1250), and in that article, the assumptions and tasks per assigned author types were first illustrated. The second mention appeared in the work of Camara et al. (2021a) when the model was recommended for integration in online research publication model. There were studies that employed the 4AA Model in their research already including those of Carolino et al. (2021), for a Physics test construction, Bermundo et al. (2021) for a study on self-efficacy indices of social studies educators, and Camba et al. (2021) for a test construction of a dressmaking course. In all these initial articles that employed 4AA, collaborative writing has been manifested.

Based on Figure 1, is this 4AA theoretically sound during these contemporary times? As acknowledged by Redes (2017) and as defined by Smith and MacGregor (1992), collaborative learning is an umbrella term for a variety of educational approaches involving joint intellectual effort by students, or students and teachers together. Smith and MacGregor noted (1992) claimed that both in theory and practice, the most concentrated effort in undergraduate collaborative learning has focused on the teaching of writing. It was observed that the development of interpersonal skills is as important as the learning itself because learning to cooperate is key to high-quality group work (Goodsell, 1992). Even in today's educational situations, collaborative learning is well suited to online learning environments built around threaded discussion and that research frameworks have developed around these practices providing methodological guidance for examining learning as a collective endeavor within the boundaries of a course (Lauron, 2008). What may not have been emphasized in collaborative learning is the acceptance of each 'actor' to accomplish the task at hand or the goal under target. The concept of Bandura (1977) of Self-Efficacy provides that an individual believes that one can perform what is expected. Thus, to require for collaborative learning necessitates that each member or actor must believe that he or she can accomplish the assigned task. Furthermore, the Community of Inquiry Framework provides that to create a deep and meaningful learning experiences, social, cognitive and teaching presences as three interdependent elements are needed to be developed (Kidder, 2015; Pool, Reitsma, & van den Berg, 2017). Thus, 4AA is theoretically sound.

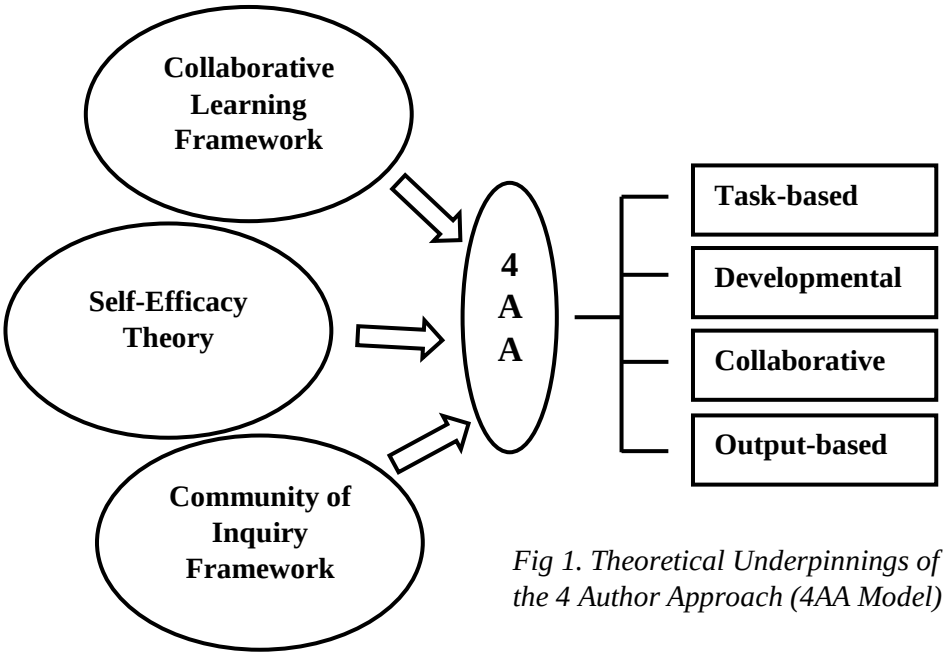

Fig 1. Theoretical Underpinnings of the 4 Author Approach (4AA Model)

This study has proposed the 4-Author-Approach (4AA) Model in writing technical reports of undergraduates as a timely innovation for research instruction in higher education institutions. Further, the study has assessed the perception of end-users in the academe (i.e. college students and faculty members) on their ability to perform what was referred to as '4AA Task-based areas' (TBA).

METHODOLOGY

Design. Exploratory Mixed Method design was employed. Qualitative analysis enabled the development of the process of the 4AA Model which was further subjected to quantitative acceptability analysis. To measure the acceptability to the participants of the attributes of the 4AA Model and its use in writing Results and Discussion (RaD) topics, the researcher scheduled a training-workshop (Dansereau, Carmichael & Hotson, 2020) on the use of the 4AA Model. Afterwards, a survey questionnaire was sent to each participant to answer about the use of the 4AA Model. Data collection was done during the 1st semester of School Year 2021-2022.

Participants. The participants in the study were pre-service teachers (n=73) and major program advisers (n=7), of the College of Education, Pangasinan State University – Lingayen Campus, Philippines, majority are female and are 21.85 of age on average. Faculty respondents were purposively sampled from the program advisers of the seven (7) areas of specialization in the Bachelor of Secondary Education degree, while pre-service teacher participants were the attendees to the 4AA training-workshop, a component of a series of college research-based activities employed at the time of data-collection. Response rates from both the program advisers and pre-service teachers who attended the training-workshop were 100%. All pre-service teachers in the College were sent an invitation to attend the training-workshop and the segmentation of attendees from the various fields of specialization is as follows: Social Studies (43.8%), Science (38.8%), Faculty (10.0%), TLE (5.0%), and Filipino (2.5%). The speaker-trainer was the model developer himself who was then a campus research official, now a college dean and concurrently a university research center head for a center on languages and innovative education. Statistical data are kept by the College Quality Assurance Office of PSU Lingayen College of Teacher Education.

RESULTS

Perspectives of Participants on the 4AA Model's Attributes

The participants (n=80) were asked to describe the 4AA Model in its various attributes. Majority of the participants claimed that the model is usable in courses in academic writing (98.8%), the tasks are doable (100%), the model is practical (96.3%), and could be used in teaching undergraduate research subject (98.8%). Further, majority of them said that they are not aware of any model similar with the 4AA model (57.5%), others are 'not sure' (33.8%), while a handful said they know a similar model (8.8%).

Comparative Perceived Abilities per Author Type

The faculty members and students were asked as to which tasks per author type based on the 4AA Model are the most difficulty to do, the easiest to do, and the moderate ones, and the results are reported in Figure 2. Based on the figure, the participants found the 3rd-author type as the most difficult, the 1st author type as the easiest, and the 2nd author type is found by most respondents to require moderate ability. It is quite interesting, however, to note of the similarity on the bar lengths for both 1st and 2nd and for both 3rd and 4th author types, as if the 1st and 2nd are similar, and 3rd and 4th are similar as well.

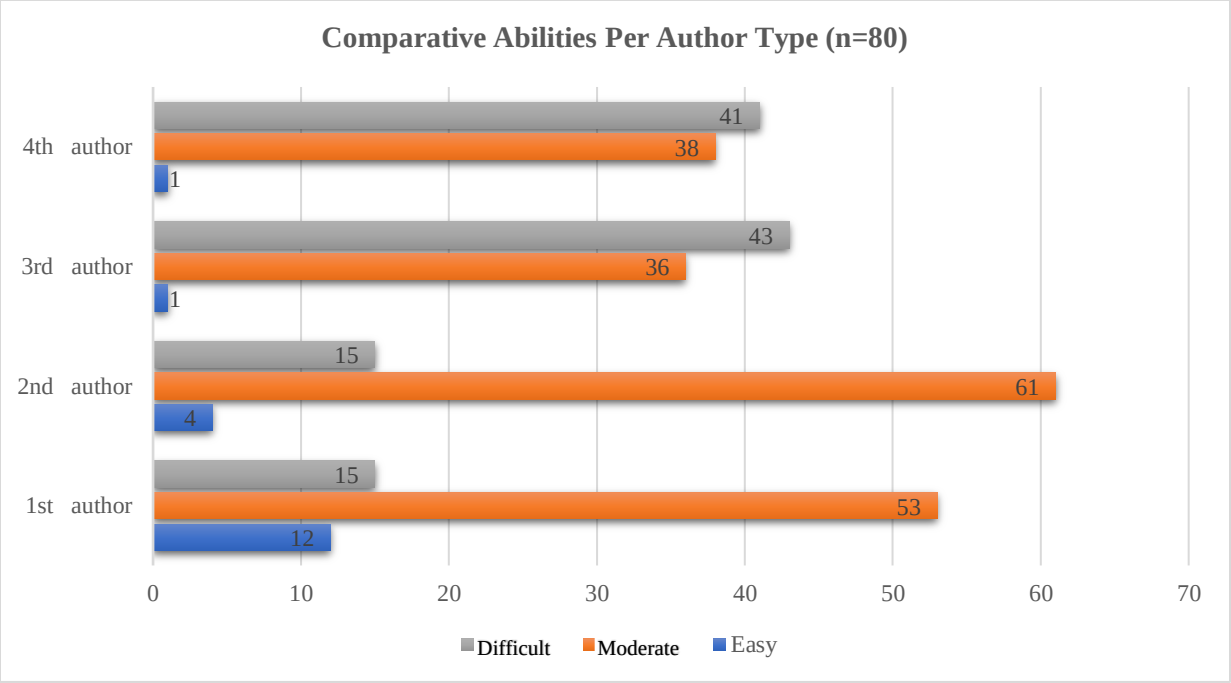

Figure 2. The comparative perceived ability to perform author tasks of the 4AA Model

Perceived Ability of Faculty and Students on the Use of 4AA Model

The participants were asked to rate their ability in performing the task-based 4AA areas with results displayed in Table 1 and were later compared (i.e. faculty and student perceived ability) with results reported in Table 2. Table 1 shows that the participants consider themselves to have 'Moderate' ability (WM=2.87) relative to the 12-task-based 4AA areas, while Table 2 shows that faculty members (WM=2.86) have means showing that they found these areas easier compared with the students (WM=3.09). While the weighted mean generally showed moderate ability, it is interesting to note that writing keywords in the paper ranked 1st and registered a mean making it the 'easiest' among the indicators while writing findings of other related literature ranked 11.5th and registered a mean making it the 'most difficult' to do.

Table 1. Frequency, Means and Description of Perceived Ability per competency

Task-based 4AA areas	Levels					WM	DE	Rank
	1	2	3	4	5			
Write Keywords in the Paper	12	22	29	12	5	2.70	MA	1
Write a Reference Section	8	22	35	10	5	2.78	MA	2
Ability to convert raw collected data into table	3	17	41	17	2	2.98	MA	3
Ability to convert raw collected data into text (paragraph form)	5	14	41	17	3	2.99	MA	4
Search through the internet related studies in a research topic	3	20	37	12	8	3.03	MA	5
Ability to convert raw collected data into figure	3	15	35	23	4	3.13	MA	6
Write an Abstract for the Paper	1	15	36	21	7	3.23	MA	7
Write in the paper a possible conclusion of a finding/result	3	6	45	21	5	3.24	MA	8
Write in the paper a possible implication of a finding/result	2	11	37	25	5	3.25	MA	9.5
Write in the paper a possible application of a finding/result	3	11	37	21	8	3.25	MA	9.5
Write in the paper a possible recommendation of a finding/result	2	8	40	25	5	3.29	MA	11.5
Write in the paper the findings of other researchers	1	14	35	21	9	3.29	MA	11.5
					Weighted Mean	*2.87*	*MA*	

Legend: 1.00 – 1.80 (Very Easy); 1.81 – 2.60 (Easy); 2.61 – 3.40 (Moderate); 3.41 – 4.20 (Difficult); 4.21 – 5.00 (Very Difficult)

Table 2. Comparison on perceived ability by faculty (n=7) and students (n=73) per competency

Task-based 4AA areas	Levels					WM	Gr
	1	2	3	4	5		
Ability to convert raw collected data into table	2	15	37	17	2	s-3.03	+
	1	2	4	0	0	f-2.43	
Write in the paper a possible recommendation of a finding/result	2	8	37	22	4	s-3.25	-
	0	0	3	3	1	f-3.71	
Write in the paper the findings of other researchers	4	13	37	16	3	s-3.01	+
	1	1	4	1	0	f-2.71	
Write in the paper a possible implication of a finding/result	2	8	35	23	5	s-3.29	+
	0	3	2	2	0	f-2.86	
Write in the paper a possible application of a finding/result	3	8	35	19	8	s-3.29	+
	0	3	2	2	0	f-2.86	
Write in the paper a possible conclusion of a finding/result	3	4	42	19	5	s-3.26	+
	0	2	3	2	0	f-3.00	
Write an Abstract for the Paper	1	13	34	19	6	s-3.22	-
	0	2	2	2	1	f-3.29	
Ability to convert raw collected data into figure	2	15	30	22	4	s-3.15	+
	1	0	5	1	0	f-2.86	
Search through the internet related studies in a research topic	3	18	33	11	8	s-3.04	+
	0	2	4	1	0	f-2.86	
Ability to convert raw collected data into text (paragraph form)	4	13	37	16	3	s-3.01	+
	1	1	4	1	0	f-2.71	
Write a Reference Section	8	19	33	8	5	s-2.77	-
	0	3	2	2	0	f-2.86	
Write Keywords in the Paper	9	20	29	10	5	s-2.75	+
	3	2	0	2	0	f-2.14	
					Weighted Mean (Studs)	*s-3.09*	+
					Weighted Mean (Coors)	*f-2.86*	

Legend: 1.00 – 1.80 (Very Easy); 1.81 – 2.60 (Easy); 2.61 – 3.40 (Moderate); 3.41 – 4.20 (Difficult); 4.21 – 5.00 (Very Difficult): Upper in a row – (s)students; lower in a row – (f)faculty
**+ - the faculty members find it easier than with the students*
**- - the students find it easier than with the faculty*

DISCUSSIONS

This study aimed to propose the 4 Author Approach (4AA) Model as a collaborative and task-based approach in the writing of technical reports, particularly the Results and Discussion section of an IMRAD Format. Central to this approach is the idea that writing does not have to be accomplished by one person but instead it could be accomplished by utmost 4 individuals with a specific writing 'tasks' assigned to each of them, and each task corresponds to the 4 author types, hence, collaborative. That writing is collaborative is supported by Kang & Kim (2022) when they claimed that today's young scientists need more practice in forming serious research teams, who working together, and producing collaborative products resulting to these teams as international, multilingual, and multicultural.

Based on the results, both the students and faculty members consider the 4AA Model as a usable approach in teaching undergraduate research. Further, it is practical and that the assigned tasks for each author type are doable. The 4AA Model has been recommended even for utilization by senior high school students (Camara, 2020) which follows the IMRAD Format, despite the emergence of other modified versions including the IMGSIE (i.e. Introduction, Method, Specification, Implementation and Evaluation) which, by the way, is used in studies under information technology (Elrashdi, Aljabour, & Omar, 2022). Technically speaking, the AIMRAD of Kurniawan, Warsono, Sutopo & Fitriati (2019) is just 'Abstract followed by IMRAD' making it essentially similar with IMRAD, only that the authors have identified ways on how each section is normally written in ELT articles, but they did not formulate any approach to write.

Further, while the 4AA Model focuses, in particular, in writing the Results and Discussion-Implications section, there are a number of studies that focus on other parts of the IMRAD sections including the work of Tabuena (2021) with his preliminary methods in writing the section on Research Framework and even the work of Swales (1990) as cited by Adika (2014) with his Creating a Research Space (CARS) Model which focused in writing the Introduction of a paper in his genre analysis. The study of Solikhah, Tarman & Budiharso (2022) showed that journal writing by students using the IMRAD Format could be enhanced by using thematic writing models but was not able to provide a new approach in writing any section of the IMRAD format. A handful of the participants thought they knew of a model similar with the 4AA model but when the researchers re-investigated the related literature (Dal et al., 2021), no similar model is published yet as of this time. This perception could be due to the non-exposure of the participants to the boundaries and scope of technical writing and any approach towards writing may show similarities.

The participants rated themselves with 'moderate ability' in performing the writing competencies for each assigned author type. While this study is the first to study perception on 4AA task-based areas, very similar studies on competence of Filipino undergraduate students (Camara et al, 2021b) showed a perception of 'High Competence' with females showing higher levels of perceived ability in research writing. Consistent with this study, Rahon et al. (2021) concluded that the level of perception of Filipino undergraduate researchers in their ability-to-do research is 'High' showing strong implication with their completion of research subjects in the K to 12 Senior High School curriculum implemented in the Philippines. The finding of the study, that their perceived ability to perform the 4AA task-based areas could be due to the idea that the 4AA model is new and they are yet to accomplish it. As regards to faculty members in higher education institutions, Perez et al., (2022) concluded that they are 'Capable' in their research knowledge. In conclusion, the 4AA Model is considered usable, practical and doable by both the faculty and students who possess at least a moderate ability to perform the writing competencies in the Model. Thus, the 4AA Model is recommended for adoption in research subjects in the undergraduate level in the Philippines. Further, a task-based specific training manual for higher education is warranted.

LIMITATIONS

The study has successfully showed the level of perceived ability of both the faculty and students towards the writing 'competencies' referred to as '4AA Task-based Areas (TBA)'. However, these 4AA TBA are researcher-listed which, though validated, are confined only to the IMRAD's section on Result and Discussion-Implications. While the maturity of the participants is a reliable natural indicator to trust their perceived ratings, the study is limited to a 5-point likert scale and did not triangulate these perceptions with outputs of the participants (i.e. the methodology on seminar-workshop is purely lecture without laboratory). Further, a study on the experiences of those student-authors who employed 4AA Model was not yet conducted, and which could be an important area of future studies.

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