

Vigor for (Academic) Rigor:
Undergraduate Student Editors' Research Understandings and Competencies
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Abstract

In 1998, the Boyer Commission on Educating Undergraduates in the Research University suggested that undergraduate students should be involved in research to improve their learning. Undergraduate research publications arose partially as a response to this suggestion because they allow students to participate in the process of learning research through performing it. They also allow students to see research as serving a larger purpose rather than simply satisfying a requirement for a grade. Students, especially undergraduates, often serve as editors on undergraduate publications, but it is unclear what they understand about research, both as it applies to their own work as well as work from different disciplines, and how well they grasp key research competencies. Using an analysis of student editor review forms, I argue student editors of an undergraduate research journal have not yet attained important research competencies, which can indicate they may not yet understand research well enough to properly review it. To remedy this, the managing editors of undergraduate research publications should review and edit their training materials and review forms to enhance student learning and maintain quality and rigor in these publications.

Keywords: undergraduate research, undergraduate research publication, journal editors, research competencies, communication

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Introduction

Since 1998, academic officials have recognized the importance of involving undergraduate students in research as soon as possible to improve their learning gains over the course of their studies. Contemporary students at large state universities may no longer attend a university for research experience and open inquiry and discovery, but rather for job training in a specific discipline. This cultural shift could have its roots in several varying issues, from the push to focus K–12 education toward success in standardized testing rather than necessarily fostering a sense of curiosity, to the lasting impact of the 2008 stock market crash, during which many students currently in college grew up and likely watched family and friends face unemployment. Whatever the reason, university students who are not seeking education past a bachelor's degree may disconnect research done for class and a grade from any real-world application. However, involving students in research from their first year in college may help them better understand the many forms research can take and the many applications it can have, even in the corporate world. Experts generally acknowledge the impact of kinesthetic learning, or, learning by doing (Allan, 2018). To further demonstrate the important real-world applications research done in an undergraduate course can have, many universities across America have established undergraduate research publications. These are peer-reviewed, vetted publications exclusively calling for undergraduate submissions, and they have grown in popularity over the last decade. Students who participate in undergraduate research can revise and submit their work to be published in these journals, giving a simple assignment for a grade more impact and weight beyond the scope of the classroom.

While researchers have established a link between submissions to undergraduate publications and increased learning gains, far less research has been done to determine the

research competencies and consequent learning gains of students who serve as peer reviewers and editors on these publications. As a student who worked on one such publication throughout my undergraduate career and eventually became a managing editor, I began to notice research skill deficiencies demonstrated in my past review forms. I also recognized the same and far more troubling tendencies of my student editorial board. While they were all high-achieving students, they often misunderstood key research concepts and had some difficulty articulating their thoughts and opinions about the quality and publishability of student manuscripts. It became clear to me that these student editors have vastly different ideas about research and appear to lack core research competencies despite their work on a rigorous academic publication. From this, I recognized it was not only possible, but highly likely the journal missed an opportunity to publish high-quality, cutting-edge student work due to some of these issues. It also calls the rigor of the publication into question if the peer reviewers and editors working on such a journal are unsure about research as a process, practice, and craft. If the paradigm of learning by doing stands, then there may be a disconnect between what the student author learns by submitting to an undergraduate research publication and what the student editor learns by peer reviewing and editing an undergraduate research publication.

In this study, I analyzed the responses student editors of an undergraduate research publication at a large Midwestern university submitted to the managing editor on special review form questionnaires in a given year. I related these responses to research competencies and understanding of the characteristics of publishable research as defined by the journal and current professional publication standards. This inquiry revealed some of the more immediate problems plaguing this particular undergraduate research publication that may apply to publications at other universities. Ultimately, it seems student editors require deeper and more rigorous training to standardize them at a base level before they begin reviewing work. It also appears managing editors and other journal supervisors who elect to use review forms may need to ask more specific, open-ended questions to prompt deeper and more thoughtful responses

and improve student editors' learning. I begin this paper by first examining undergraduate publications and their value as noted by other researchers. I also discuss measures of research competencies both for journal editors and for undergraduate students. I then provide a brief overview of the study, present the results of this inquiry, and propose implications and directions for future research.

Review of Literature

Undergraduate research publications have become a standard in many universities across the country, particularly at research institutions. The Boyer Commission on Educating Undergraduates in the Research University (1998) found that involving undergraduates in research from as early as possible in their careers improves learning and discovery (26). Often this research is submitted, either in tandem with a faculty co-author or alone, to research publications, including those that are undergraduate-exclusive (Weiner & Watkinson, 2014, p. 2). This process of writing for an audience has proven beneficial as supplemental to classroom learning and a potential way to improve professional research and writing skills for student authors (Weiner & Watkinson, 2014, p. 10). However, little work to date focuses on the benefits to those students who work on the research publication: student editorial boards.

Discussions of student editors for student-run publications in current scholarship centers primarily on students in law, medicine, or journalism. Universities often offer student-run publications, particularly law journals (Zimmer & Luther, 2009) and medical journals (Wan, McMurren, & Teo, 2016). Even then, student editors of student-run publications are primarily graduate or doctoral students (Hopwood, 2010). Undergraduate student editorial boards for undergraduate research journals are understudied and under-assessed, so it is difficult to yet determine how undergraduate student editors define and understand research and the core competencies they master (or do not master) as a result of their work.

While some scholars, especially in the scientific community, present issues with undergraduate research and undergraduate-only publications, particularly about undergraduate

journals publishing work of little significance to the broader professional communities (Gilbert, 2004, p. 23), these publications are in fact beneficial, both to students and to the larger professional communities. Undergraduate students may at first lack the skills and expertise required to compete with their superiors in the discipline, and, without proper training and practice, it is difficult for them to find acceptance to popular journals until their graduate or doctoral studies. However, they may still be engaged in significant research projects, both in the sciences and the humanities. The presence of these undergraduate journals provide students an opportunity to learn how to write for an audience, particularly the audience of their field of study, rather than going through the motions of research to satisfy an unspoken fact quota or receive a grade but never go further in the academic conversation (Booth et al., 2016; Allan 2018). Studies have revealed significant learning gains and improvement in the understanding of research as a result of participation in student-run undergraduate research publications as student authors (Weiner & Watkinson, 2014; Dyke Ford & Newmark, 2011). Some scholars, like Siegel (2004), wonder whether it is necessary to, segregate undergraduate research into undergraduate-only journals,” (p. 26). Her reasoning poses an interesting question related to this segregation: “With 6,000 journals in science, technology, and medicine—and 24,000 peer reviewed journals overall—the advantage to the reader of a journal devoted to undergraduate research is not obvious” (p. 26). She asserts that research is nonageist, so researchers at any level or age should theoretically be able to make and publish their discoveries (p. 27). However, this claim feels like a statement regarding what journals and academic research should be, rather than confronting the implicit ageism of academia and the professional world; experience is often a condition and requirement of publication or employment, and young adults, especially those still in school, likely will not have it. Undergraduate authors, as newcomers in academia, often need to have experience with research, an understanding of research, and mastery of research competencies before their work is published. Unless the student works with a faculty

member who already has credibility in the research of a discipline, their chances of publication in one of Siegel's 24,000 peer-reviewed journals can be incredibly slim.

Research journals are so far considered the best way to exchange ideas and carry on the scholarly conversation, particularly because they have a shorter publication schedule than books, and they serve as the most impactful way to shape disciplines (Sparks, 2014, p. 155). To allow undergraduate students a chance to publish their work, experience the publication process as more than their name buried in a string of professors' names for their contributions to a published research article on a topic they may not have chosen or really worked with, undergraduate research journals fill an important gap. More than that, they can provide avenues for student editors to learn more about publishing, particularly academic publishing, gain valuable research experience and practice, and improve their research and writing skills. Unfortunately, the specific learning outcomes for student editors of research journals are often ignored in the discussion of the necessity and benefits of undergraduate research publications.

Student understandings of research

In a multidisciplinary undergraduate research publication like the one I studied, where the entire editorial staff is composed of undergraduate students from across the disciplines, some barriers to success arise. Because students may lack research skills, it follows that student editors from multiple disciplines would experience these same potential problems. Students may misunderstand the goals and varieties of research, the qualities of research, and the importance and characteristics of good writing related to the communication of research findings. Fundamental misunderstandings about research may not be the fault of the individual student, but it is the responsibility of the student and journal leaders to bridge whatever gaps exist.

Undergraduates' understanding and perceptions of research and writing may carry over from what they learned during their K–12 education, and this could be an issue when they join a student editorial board. It may lead to some misunderstandings of the nature of research and to

skill deficiencies when attempting to review the quality of their peers' research writing. In research, it appears many students come from a secondary education background wherein research was performed through experiments from a textbook in a science lab or by consulting Internet and print sources to discuss a topic or argue a point. In this traditional academic research, Booth et al. (2016) suggest researchers, particularly novice researchers in secondary education or early in their college careers, may erroneously attempt to cram as many facts as possible into an essay to satisfy an instructor and earn a decent grade (p. 11). Böttcher and Thiel (2018) propose that undergraduate students, as a next step in the learning process, "are introduced to single requirements of the research process in different exercises or small projects. Particular skills are encouraged step by step, for example first, searching for literature in the library and second, evaluating prior research" (p. 103). Master's students, by contrast, may carry out more phases of the research process, and PhD students have the opportunity to complete the full research process (Böttcher and Thiel, 2018, p. 103) But, with the emphasis on undergraduate research adopted by more universities and liberal arts colleges across the nation, stemming from the initial work of the Boyer Commission, undergraduate students need to learn about research and its varieties and engage in those processes sooner and at more advanced levels.

In teaching pedagogy, particularly regarding research, it has been suggested there is no substitute for doing, with experiential learning as a significant part of the learning process for many students (Allan, 2018, p. 250). One issue, however, may be that students cannot necessarily define research. There are many possible definitions of research, but one of the more comprehensive definitions, including the working rhetorical definition from Johnson-Sheehan (2007) related to technical writing: "Research is now a process of shaping the flow of information, so you can locate and utilize the information you need. ... [Y]ou need to learn how to evaluate, prioritize, interpret, and store that information so you can use it effectively" (p. 145).

Looking at research this way, as the process of shaping the flow of information to be located and used later, students may have a more correct understanding of research.

When asked to define research, students seem less than confident. Ross' (2014) research suggests students have a vague understanding of research but still recognized that research “involves the gathering, ordering, and/or negotiation of information (77–78). Two definition categories arose from student responses: investigation and accumulation (78). This also suggested that students perceive research as an “engaged *process*, or as a less complex act of collection” (78). Other studies suggest students perceive research as important to their success and engaging (Vereijken et al., 2016). Researchers also found that “beliefs about the value of research for future practice are more strongly related to student achievement than perceptions of research in teaching and beliefs about research promoting current learning” (Vereijken et al., 2016). This suggests student understandings of research center on how it can be applied to their future and career or research success rather than how it can enhance current learning. Across the disciplines, in the process of performing research, students in general value obtaining new knowledge, a chance to improve their resumés, the opportunity to learn how to conduct research, and preparation for graduate studies (Craney et al., 2011, p. 99). Other studies suggested similar values; one survey of student researchers found students reported “personal/professional gains (28%); “thinking and working like a scientist” (28%); gains in various skills (19%); clarification/confirmation of career plans (including graduate school) (12%); enhanced career/graduate school preparation (9%); shifts in attitudes to learning and working as a researcher (4%); and other benefits (1%)” (Seymour et al., 2004, 493). While this study supports the idea that students in general may perceive research as beneficial to their futures, they may struggle to define and understand it. This research does not address undergraduate publications at all, nor does it examine whether these same ideas about research hold true for student editors of undergraduate research publications.

Student research competencies

In the professional world, journal editors must possess specific characteristics and master certain competencies to succeed in their roles. Journal editors must first facilitate the scholarly conversation, though they are often mischaracterized as gatekeepers to publication (Sparks, 2014, p. 155). They must also engage in peer review, which has become a point of contention in some academic circles due to its perceived mystery (Jackson et al., 2018). Peer review, however, is integral to the thinking and learning process. It can be considered pedagogical, conversational, and almost Socratic in the way reviewers pose questions to, and thus enhance the learning of, all parties involved (Jackson et al., 2018). To be effective reviewers, journal editors must understand the writing and research processes. They must also make decisions systematically, logically, and rationally based on some criteria of what constitutes good and original scholarship in a discipline (Zimmer & Luther, 2009, p. 962). They should also make these decisions based on sound ethical principles. These editorial characteristics extend to student editors, as undergraduate research publications often strive to uphold the same level of rigor as professional research publications. However, none of this current scholarship regarding journal editors addresses student editors specifically, so an application of these qualities can only be inferred. Because student editors do not yet have the level of understanding or experience as professional researchers, their unique qualities ought to be addressed. Most obviously, they do not necessarily yet have the depth and breadth of knowledge that would give them an idea of the qualities of good and original scholarship, and studies may reveal how they make their decisions, as well as the effectiveness of their decision-making processes. Student editors are also still learners, making it important to address best practices for teaching these skills and developing these characteristics. No scholarship yet exists in these unique areas.

Work on an undergraduate research journal may demonstrate the benefits of research to undergraduate students and can improve their mastery of core research competencies. Based on

Vereijken et al.'s (2016) study, undergraduate students need to understand their potential learning gains to help them recognize the value of research. Undergraduate student authors submitting to undergraduate-exclusive research publications, as we have established, experience significant learning gains in academic and research skill areas as a result of the submission, revision, and publication process. Students who work on a research journal editorial board should theoretically experience similar gains in academic and research skill areas as their student author counterparts, as well as certain skills beyond what a student author could achieve. They should gain deeper knowledge about the academic publication process and the amount of work that goes into the vetting and shaping of new knowledge in a discipline (Sparks, 2014; Dyke Ford & Newmark, 2011; Weiner & Watkinson, 2014). But beyond that, they should come away with other competencies. Some important competencies identified by Weiner and Watkinson (2014) included the following: how to write about research for an informed, public audience; the process for publishing an article; how scholarly publication contributes to the research community; how to use evidence to draw conclusions; how to evaluate the credibility of authors of articles/books/reports; and how to work collaboratively (p. 8). Admittedly, few students reported some or significant gains in these specific competency areas as a result of working on the editorial board of Purdue's undergraduate research publication; more students experienced increased gains from submitting. This suggests a disconnect in learning and understanding between the creation, writing, and submission of research and the "judgement" or "gatekeeping" of research. This could therefore underscore a potential need for improved training of reviewers and editors on a journal's student editorial board. However, few scholars have studied this disconnect or the potential training needs of undergraduate research journal student editors.

While measuring a concept like research competencies, it is important to have specific criteria by which to judge mastery. Böttcher and Thiel (2018) propose a new instrument that can be used to encourage research-based learning and measure research competencies, or, *R-Comp*.

This “cross-disciplinary competence model” evaluated student research competencies in five main dimensions that split into further sub-dimensions (p. 101). These main dimensions, which results suggested were more effective than previous models and dimensions, are the following:

- Skills in reviewing the state of research
- Methodological skills
- Skills in reflecting on research findings
- Communication skills
- Content knowledge (Böttcher and Thiel, 2018, p. 110)

This model can be applied not only to university students generally (as they tested students at the Bachelor, Master, and PhD levels), but also to student editors of undergraduate research journals to measure their competencies and learning gains. This model is adaptable to shift from evaluating student competencies in a classroom to exploring the competencies student editors should attain through their work, and simultaneously look for when reviewing manuscripts. This can serve as a guide to help journal leadership create more effective reviewing materials. Finally, it may help resolve the disconnect between the learning gains of student authors and student editors and provide a starting point from which to study student editors.

Methods

This study seeks to describe understandings and perceptions of research by undergraduate student editors of an undergraduate research publication based on their reviews of submitted student manuscripts. This qualitative study follows the Boyer Commission’s assumption that undergraduate engagement in research is important for student learning and Allen’s assertion that experiential learning is imperative and uses the Böttcher and Thiel (2018) *R-Comp* model. I hypothesize that undergraduate student editors today may have varying and sometimes opposing or outright incorrect views about research, and that these views may carry over to their reviews of student manuscripts. To learn more about student understandings of research and their attainment of core competencies, I analyzed student reviewers’ candid word choice and commentary on peer reviewer forms for the undergraduate research journal at a large Midwestern university. I suspected student editors may not yet demonstrate key research

competencies and may experience difficulties related to the wording of questions on the review forms.

Research Design

During a typical peer review for this journal, student editors read a manuscript and make comments in Microsoft Word directly on the draft. They then fill out a review form (see Appendix A), answering prompts with their thoughts and feelings regarding the submission. They are asked to make a publication decision at the end of the form. They also meet to collaborate with other peer reviewers and editors and discuss the piece in greater detail, often generating more ideas about it and making more concrete decisions. Those decisions ultimately determine which pieces move forward in the publication process and which are excluded from further consideration. Regardless of publication decision, all student authors who submit to the journal receive the reviewers' anonymous feedback, compiled by the managing editor.

Qualitative analysis of the student editors' review form responses allowed me to better understand the ways the student editors think and write about research. It is difficult to showcase thought processes and understandings in numbers. Because most of the work student editors perform deals specifically with writing about research and article and audience analysis, and because this information directly relates to the conditions at one university and in the staff of one publication, qualitative analysis provided a more nuanced image of the student editors' thoughts, understanding, and decision-making processes. Additionally, it is important to note that each student editor reviewed more than one research piece, so the number of forms analyzed or number of a certain response type do not reflect a number of *students* who have a certain perception of research. Responses are rather meant to demonstrate the overall sentiments of the student editors as a unit and provide an idea of the volume of review forms that demonstrate Böttcher and Thiel's (2018) research competencies.

The form used to code responses and methodically analyze the text is adapted from Böttcher and Thiel's (2018) instrument to measure undergraduate research competencies.

Future researchers could use the same or similar models to analyze the work of student editors at other undergraduate research publications nationwide to more consistently demonstrate a trend.

Sample

I compiled review forms (see blank sample in Appendix A) from consenting members of the student editorial board of the undergraduate research publication during the 2018–2019 reviewing cycle for Volume 12 of the journal. I chose this particular sample year for two reasons: first, because it was the one of the largest student editorial boards the journal has had, and, second, because the journal received a record number of student article submissions that year (109 submissions). This staff was also selected because it was the most recent reflection of undergraduate student understandings of research and because they served during a year of production issues that delayed the journal's publication by about two months.

The staff of the undergraduate research publication is composed of undergraduate students from across the disciplines at a large Midwestern university. The one common trait they share is their status as Honors students. They span age levels, skill sets, and mastery of those skills. They come from different locations, are different ethnicities, and come from different socioeconomic backgrounds. They are typically 18 to 22 years old. They are overwhelmingly female, at about 60% of all staff. Because they are all Honors students, they all enroll in the same or similar courses within the Honors curriculum related to interdisciplinary studies, academic conversation, and research. They have also all been through the same training workshop in Fall 2018 and worked under the same managing editor for at least a year.

From this pool of journal staff, I obtained 12 student editor participants. Because student editors review 10 to 15 submissions in a semester, I received 73 documents to work with. Of these documents, I analyzed 45 to achieve a decent sample size and be able to draw reasonable conclusions about the current understandings of research while also keeping the information manageable.

This study was submitted for approval through the university's Institutional Review Board and was categorized as exempt. Student editors were contacted via email by the official Honors email account with a FERPA release form asking if they would allow their materials to be analyzed. To maintain student editor confidentiality and anonymity and adhere to FERPA guidelines, names were removed from the review forms by faculty and staff supervisors of the journal. Forms were randomized and assigned a numerical identification code from 100 to 173.

Data Collection

Over the course of several days, I checked into the Honors office to collect data. I collected the data on a secure computer terminal on the university's server to mitigate the risk of unwittingly releasing sensitive, confidential information. Data and notes were only stored on secure servers through the university's cloud storage system. I looked specifically for qualitative responses related to research originality, quality, standard components (such as a thesis or conclusion), argumentation, methodology, ethics, suggestions for improvement, and publication decisions. These were chosen because they are items student editors are prompted to look for in the questions on the review form and because they correlate to Böttcher and Thiel's (2018) *R-Comp* instrument for determining undergraduate research competencies and the broad categories the researchers studied. They are also integral parts of a well-designed and well-written research article, and understanding of these items is necessary if student editors are to make informed publication decisions and provide comments and feedback to teach student authors how to improve their writing. They can therefore tell much about the student editors' candid understandings.

Collection excluded review forms for creative writing and artwork. Although the university classifies these types of student work as research, and the journal reviews and accepts them, the journal review forms for creative writing and artwork ask student editors to look at different aspects of creative work that would not necessarily transfer to a discussion of empirical or academic research.

Procedure

I adapted Böttcher and Thiel's (2018) *R-Comp* to look for five distinct dimensions and several subdimensions in student editors' review forms. I added a sixth dimension to account for the choice student editors are asked to make about publication of the articles they review. This sixth dimension, specific to student journal editors, is "Skills in making publication decisions." I looked for the following subdimensions, also adapted from Böttcher and Thiel's (2018) model as well as the research journal's student editor review forms:

- Skills in reviewing the state of research
 - Can the editor tell if this piece fills a specific research gap?
 - How does the editor define originality related to this piece?
- Methodological skills
 - Does the editor find and evaluate a thesis/hypothesis?
 - Does the editor evaluate the methodological quality of the research?
- Skills in reflecting on research findings
 - Does the editor propose a way the piece contributes to the discipline?
 - Does the editor evaluate ethical implications beyond ethical citation of sources?
- Communication skills
 - Does the editor focus on issues of grammar, usage, mechanics, spelling, and punctuation?
 - Does the editor maintain a professional, academic tone?
 - Does the editor's comments meet the length standards for editor commentary for the journal and elaborate on their comments?
 - Does the editor include at least one good thing the author did in the piece?
 - Does the editor make concrete revision suggestions?
- Content knowledge
 - Does the editor understand or appear to understand the topic, or do they operate on a misunderstanding?
 - Does the editor understand or appear to understand the terminology used in the review form's questions?
- Skills in making informed publication decisions
 - What publication decision does the editor recommend?
 - Does the editor provide an explanation for this recommendation?
 - What is the editor's explanation?

Most of these questions ask for a yes or no response, but in my notes, I also included what the editor wrote to demonstrate how and why they did or did not demonstrate a competency.

I looked over each research review form, making note of these items. I also noted other interesting anomalies on the review forms, such as questions left blank, questions marked

“N/A,” and comments that did not quite fit a specific area listed above but still related to an understanding of research.

Results

Results of this inquiry indicated student editors have a decent grasp of certain competencies over others. Some of these competency gaps were rather unexpected. In general, under the “Skills in reviewing the state of research” competency, student editors appeared to overwhelmingly understand the concept of originality, with many comments implying originality within one of the following four categories:

- Never been or not usually done
- Applies personal ideas or experiences
- Presents new ideas or unique perspectives
- Not a summary of or reliant on other sources

Of the 45 samples analyzed, 37 (82%) provided reasoning for a piece’s originality. Research gaps were rarely (fewer than five forms) mentioned.

Under the “Methodological skills” competency, student editors evaluated the thesis slightly less than half the time. Twenty review forms (44.4%) evaluated a manuscript’s thesis or main argument for quality and strength, while the majority, 25 (55.6%) did not. More strikingly, despite a question on the form asking about methodological quality, forms rarely addressed the specific methodology of the manuscript. Even in manuscripts containing empirical scientific studies with a clearly labeled “Methodology” section, the forms do not typically evaluate the methodology of the experiment or inquiry. Only eight of the forms (17.8%) addressed methodology, and many did so inadvertently under other questions. An overwhelming majority of the forms (36, 80%) did not review this core research component.

In the “Skills in reflecting on research findings” competency, the forms indicated some major roadblocks for student editors. In many of the documents, the student editors did not appear to have closely read Question 3 about the manuscript’s contribution to a field of study. Rather than answering how, as the question asks, many forms simply stated that yes, a

manuscript fit a discipline or no, it did not. This also belongs to the “Content knowledge” competency, where it appears some student editors may be struggling with the terminology used in the review form or the wording of the questions. Despite the importance of ethics in publications, especially in research journals, it surprised me to learn that only seven forms (15.6%) contained any evaluation of research ethics beyond proper source citation. This, despite a question on the review form discussing the research ethics in the manuscript. While source citation is an important ethical consideration, it is generally not the only measure of a manuscript’s ethics.

Review form responses indicated a clear competence in communicating about research. While some forms showcased issues with an editor’s tone or ability to elaborate on their opinions, and while a few forms did contain mentions of grammar, usage, mechanics, punctuation, formatting, and style—which the managing editor explicitly asks student editors to avoid—this area showed great promise. Most prominently, nearly 100% of the forms contained at least one item of praise for the manuscript and the author, and 34 forms (75.6%) included concrete suggestions for improvement. For the purpose of this study, “concrete suggestions” described comments that specifically tell an author what should be done to improve, while “vague suggestions” described comments that only mentioned what the author needed to improve upon. For an example of this, see *Table 1*.

Finally, in the competency I added to the Böttcher and Thiel model, “Skills in making informed publication decisions,” results were staggering. The review forms suggested one of two possibilities: either student editors assume the review form itself serves as an explanation for their publication decision, or they are not certain why they make their publication decisions about a manuscript. The latter seems particularly apparent when student editors answered questions with only a “yes” or “no,” listed one or two items to be improved, and marked “Is Unacceptable for Publication.” This kind of form warrants an accompanying explanation so the managing editor can get a better sense of the student editor’s reasoning. Only six review forms

contained any form of explanation for the editor's publication decision, and it is possible all six or a healthy majority of that six came from the same editor. The majority of the forms (39, 86.7%) only contained a mark next to the editor's recommendation without an accompanying reasoning. A graphical representation of these key interest areas appears in *Figure 1*.

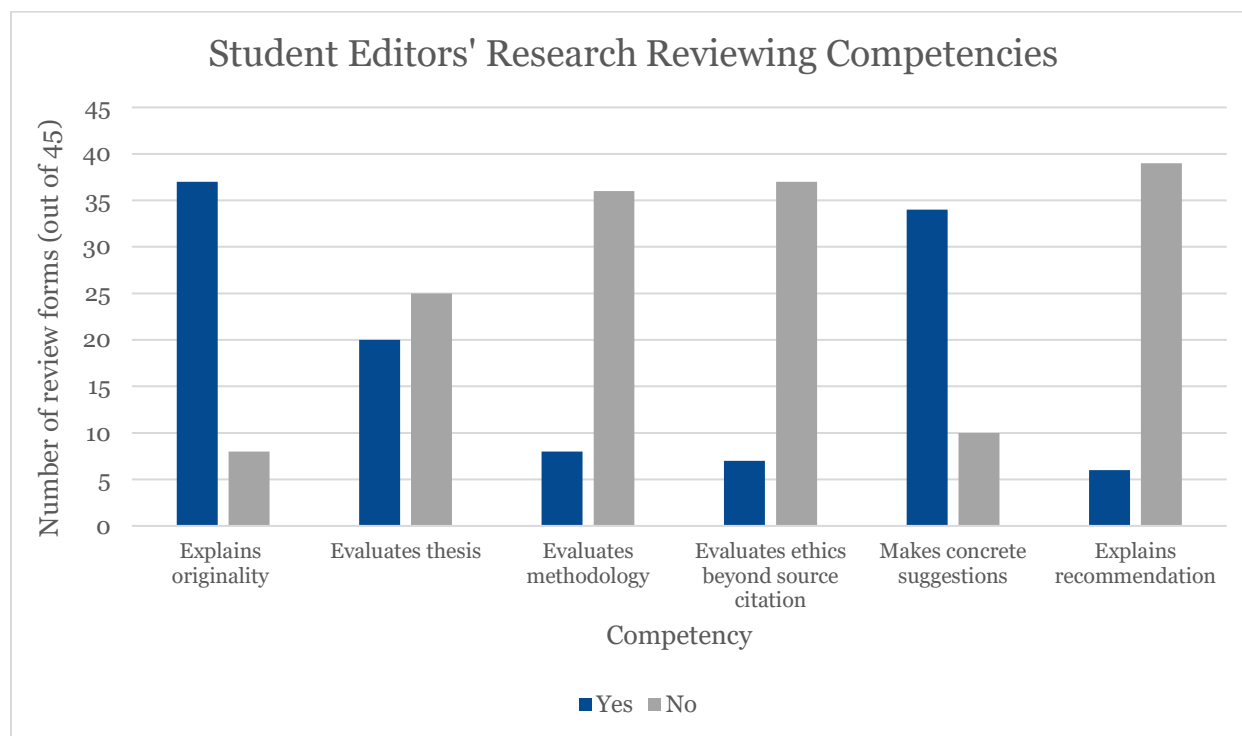


Figure 1: Results of the review form analysis suggest that, while student editors are excelling in certain areas, like defining originality (skill in reviewing the state of research) and making concrete suggestions for improvement to the author (communication skills), they are struggling to obtain quite a few of these.

The qualitative responses on the review forms revealed vast discrepancies in student editors' understandings of research and its components. In a comment about a manuscript's contribution to a field of study, a student editor revealed a content knowledge gap related to an understanding of what constitutes research: "I do not think it contribute to a field of study, *it is rather an argumentative paper than a research one*" (emphasis added). This appears to imply argumentative or persuasive papers are not research, which is not always the case. In fact, based on the presence of a hypothesis or thesis in all papers, it seems all research is in part meant to make an argument or persuade an audience. Another review form contained this comment for

Question 2, which asks whether the piece could be considered a review paper: “Yes, I would most likely consider this a review paper because *the author is basically basing his/her paper on other published articles.*” This reveals a gap in the “Skills in reviewing the state of research” competency, as the student editor appears not to understand that all research must build on the work of previous researchers and contributes to a larger conversation. *Table 1* offers other examples of comments that do and do not illustrate a student editor’s competence in each of the six competency dimensions.

Table 1: This table includes comments that exemplify the kinds of responses from student editors demonstrating and failing to demonstrate each of the six competencies. Comments were copied, unedited, directly from anonymous review forms.

Competency	Response demonstrating competency	Response not demonstrating competency
Reviewing the state of research	“This work is original in that it analyzed Disney Animated movies for racial representation using U.S. Census records. However, I think it is not original in that there has been a lot written about how Disney has inaccurately represented different cultures and races.”	“The work is original because it uses multiple references to explain their point.”
Reviewing methodology	“... the data collected are thoroughly explained in the paper. The author does an excellent job of being transparent in methods and materials used.” “Everything in this paper is supported by related literature and uses appropriate controls to draw meaningful conclusions.”	“I would say the research is thorough and includes decent source material to back the claims being made. They provide acknowledgement and credit to the sources used, which leads to my conclusion that this paper was ethically and methodologically researched.”
Reflecting on research findings	“There is a question of ethics, in my opinion, about the overall message of the piece. However, they conducted ethical research that used methods that made sense in regards to project to answer the question of whether or not hazing makes a difference in FSL life.”	“The research is clear and ethical.”

Communication skills	“The sample size is too small. Especially since there are different regions represented and results drawn from them, there should be more than one student from that country in a sample.”	“the thesis”
Content knowledge	“The paper keeps referencing other papers and is well written, but there was not experiment or statistical interpretation of these facts. It felt almost like it was supposed to be persuasive. A well researched and compelling article, but not exactly research.”	“No, based on my understanding, I would say this is not a review paper or a literature review. The paper lacks the amount of sources required and does not include all current/relevant information relating to the Core Curriculum used by the U.S. education system. I would say that this is a well-written argumentative paper that is phenomenal.”
Making publication decisions	“I personally enjoyed reading this piece. The topic was well-chosen and the paper itself is well-written. Although it may require substantial revision to reach publication quality (expansion, meeting the expectations stated in the abstract, and more sources), I think it has a lot of potential.”	Marked accept without change; question mark “?” as explanation

Discussion

After collection, I noticed certain trends appeared in the data. It seemed that, while student editors’ forms illustrated a fairly standardized grasp of certain competencies from the Böttcher and Thiel (2018) adapted model, an overwhelming majority were missing key elements. The results of my inquiry revealed some key concerns and the need for further research. Ultimately, the results suggest that the journal staff may wish to reassess the ways the review form questions are worded and consider revising them so they ask more explicitly for student editors to provide more concrete, complete responses. Many of the issues seemed to stem from student editors not understanding questions, or questions asking for simple yes-or-no responses rather than open-ended questions that promote critical thought and require elaboration.

Attainment of Competencies

Many of the student editors demonstrated competency in the major areas the journal trains them for, including evaluation of originality, professional and polite written commentary,

and avoiding comments about grammar and other lower-order concerns. Some of the repetition of concepts in the journal's training protocol may therefore work. This suggests some of the major problem areas for student editors could be addressed through more targeted training. More research would be required to determine a true causal relationship, but there exists a possible correlation between the areas of emphasis in training and the research competencies student editors demonstrated.

Many of the review forms that did contain longer explanations with concrete suggestions and more than one or two sentences of elaboration seemed to correlate with a better grasp of research competencies. When student editors only answered with a "yes" or "no" or only created a single complete sentence by restating the question in the answer, it was often difficult to determine whether they had a grasp of research competencies. Managing editors could not send these single-sentence reviews to a student author as revision feedback, excluding many of those responses, and, by extension, those student editors' input, from the academic conversation. Again, journal managing editors could remedy this through training protocol and more explicit instructions and purposefully worded questions.

Difficulty with Specific Research Competencies

I was most surprised that most of the review form comments so often failed to discuss methodology and ethics. While it certainly can be difficult for an undergraduate student editor to assess the methodological quality of traditional academic research or examine the ethics beyond proper citation of sources, even in the review form discussing scientific, empirical journal submissions with a "Methodology" subheading, student editors did not assess the methods or ethics. In fact, in one review form, the student editor mentions, "The method section was well done," but they only responded "Yes" that the research was thorough and ethical, and the methodology was appropriate. This implies the author included a methodology in the manuscript, but also illustrates that the student editor did not evaluate methodological quality by any metric. In fact, the lack of a concrete, thoughtful response here suggests the student

editor may not really understand how to determine whether methodology is appropriate. Both methodology and ethics seem intrinsically tied to sources and citations for undergraduate student editors. These two concepts are also linked, likely due to the review form question that puts them together. This area may require both training and edits to the review form questions.

I was also concerned about the lack of publication decision explanations. Student editors have four recommendations to choose from when determining whether the journal ought to publish a manuscript. This decision carries much weight, but the comments on the forms do not often include explanations that could give a managing editor some sense of the student editor's criteria. It appears student editors may make many of these decisions arbitrarily or subjectively rather than objectively and based on evidence. The journal's student editor training materials contained a rubric-like chart discussing criteria for publication decisions, yet these criteria rarely, if ever, accompany a student editor's recommendation. To maintain the rigor, quality, and credibility of the journal, its student editors may require more training and a question on the review form that specifically asks them to explain their recommendation.

Difficulty with the Review Form Questions

During data collection, it appeared that student editors often did not understand or fully read through the questions on the review form. Often, the questions were not worded to require an explanation or elaboration beyond a simple "yes" or "no" response. This was especially apparent when the form asks student editors about a thesis. While they often discussed that yes, a thesis was present, or no, there was no discernible thesis in the work, they did not often evaluate the quality of the thesis for argument deeper traits, such as quality, strength, and relevance. This may suggest that, though we train our student editors during the fall semester, they may not relate some of the items discussed during training to the questions on the review form because the form does not explicitly ask about concepts like relevance or quality and strength of a thesis. Additionally, there is a question early in the review form (see Appendix A) that asks, "To the best of your knowledge, how does the work contribute to the field of study?"

Frequently, despite this question explicitly asking, “how” the work might contribute, student editors would only respond “yes” or “no.” For example, in one sample, the student editor says, “I feel like this paper doesn’t contribute to its field of study in a huge way, or in a new way,” and while this response technically meets the length standards for a student editor of this research journal, it does not really answer the “how” or “why” questions. In another sample, the student editor answers this question of contribution in the following way: “I think this contributes to the field of study well because of the depth of analysis. Also, the relevance of Disney and The Little Mermaid, compared to a lesser-known film gives this piece some uniqueness.” Here, the editor’s subjective “contributes to the field of study well,” not only fails to tell the managing editor how the work makes a contribution, but also fails to explain the student editor’s own criteria to determine it contributes well. The review forms may need some revision based on these misunderstandings to achieve better, more thorough responses. Additionally, student editors may require further training about how published research generally contributes to its field and what constitutes a research gap.

Difficulty Understanding and Discussing Research

The review forms revealed interesting instances of student editors’ lack of understanding of research itself, as exemplified in the Results section. More than gaps in understanding research, however, the forms appear to indicate a larger problem: student editors lack a standard, shared vocabulary with which to talk about research. For example, one form contained the following response to the question, “Is the research thorough and ethical, and is the methodology appropriate?”: “I would say the research is thorough and includes decent source material to back the claims being made. They provide acknowledgement and credit to the sources used, which leads to my conclusion that this paper was ethically and *methodologically* researched” (emphasis added). This response may indicate this student editor assumes “methodology” can describe research, just as “ethical” can. Many forms contained examples of student editors uncertain of or entirely lacking a vocabulary with which to discuss and critique

research. As another example, one form included the response, “The author explores the relationship psychology plays in conservation,” as a description of the piece’s originality. I could infer the student editor suggested this as evidence for originality because he or she believed research has not yet demonstrated this connection. However, that conclusion can only be inferred. This could also imply the student editor lacks a vocabulary to express his or her thoughts about the piece’s originality, so those thoughts can only be conveyed vaguely and through context and inference. More research is needed in this area to draw more concrete conclusions, but there may be a possible correlation between a student editor’s grasp of research competencies and having or lacking a vocabulary to discuss research.

Conclusion

Undergraduate student editors of undergraduate student research publications appear to have some general misunderstandings about research and may lack several core research competencies, possibly preventing them from achieving the same learning gains as their student author counterparts. The results of this study fall in line with the suspicions I had when beginning this inquiry, but they also revealed more than anticipated. It appears more time and focus during training should be dedicated to research varieties and concepts, and student editors should have the opportunity to practice reviewing with special attention paid to these concepts. However, it also appears the prompts on student editor review forms may lack the specificity and open-endedness that could elicit more insightful responses and promote discovery and learning through writing. Apart from any misunderstandings about research, and beyond training protocols and form revisions, however, the results revealed that student editors may not have a standard vocabulary they can use to talk and write about research during their undergraduate studies.

These results support the idea of a disconnect between the learning gains student authors attain from participation in undergraduate research publications and the learning gains student editors experience, as well as the need for a larger conversation addressing the rigor and

credibility of undergraduate research journals and the work they publish. While it is partially the responsibility of research publications to address some of the lesser-grasped research competencies in their student editors, these results may also warrant a larger conversation about the ways students learn about research during their K–12 education and even through the first few years of their undergraduate studies. It is, after all, difficult to retrain a student once he or she has heard the same ideas and concepts for many years. If officials still agree that research is integral to learning, and if the paradigm of learning by doing persists, then it is important to teach students about the purpose of the essays they write and the academic research they do and help them see that work as more than just satisfying a grade. This can help ease the transition from traditional academic research to empirical research once a student attends college or university.

While this study provides part of a picture about student editors' understandings of research and research competencies, it is not without limitation. First, the sample size is relatively small, and the knowledge only really pertains to student editors at the specific Midwestern university undergraduate research journal. Further research may be needed to assess other undergraduate research publications in the state, region, and nation to more appropriately establish a trend. This procedure also may not necessarily work with all undergraduate research journals, as the models and staff may differ slightly. Further research could determine whether having such forms and having multidisciplinary undergraduate editors is effective compared to other editorial styles.

Apart from scope and sample, this research is also limited by the method of data collection. I chose to analyze artifacts because they appeared the most candid examples of student editors' perceptions and understandings of research. I was concerned interview questions or survey responses might discourage student editors from answering honestly for fear of repercussions or humiliation. Future studies should perhaps include survey data to determine the rhetoric students use to define and discuss research more formally. A mixed-

methods study may also further support the theory that better training is imperative to standardize understandings of research and research writing skills across the disciplines before students serve as journal editors.

This study does not address or explore the reasons student editors appear to struggle with certain research competencies or appear to misunderstand aspects of research generally. Such an inquiry fell beyond the scope of this particular study. Future research may uncover the root causes that lead to these results.

Finally, the problem of student editors misunderstanding research was defined based on observations at a changing of leadership within a specific undergraduate research publication staff following a year of production woes. This problem could have been an outlier scenario, though research points to the trend that undergraduate students at large universities undervalue research despite the push to include them and the evidence that participation in research correlates to greater learning gains. Students have generally begun to view the university as job training and may underestimate the need for research skills in a career beyond their undergraduate studies. However, it is possible that this problem has other causes apart from lack of training, and further research may be needed to determine such causes.

Future study may address some of these limitations, as well as explore other related areas. Research could focus on how journal leadership can best revise reviewing and training materials to ensure students better understand research and academic peer review. They could also determine whether these same issues occur at other institutions to draw larger and more generalizable conclusions about undergraduate research programs in general. Finally, future studies could analyze the reasons students' understanding of and vocabulary for research so vastly different. This could determine a better way to standardize research-related vocabulary and give students the tools to better understand, read, write, and think critically about research.

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Appendix A: Sample Student Editor Review Form

This document contains all the questions asked to student editors. The editors fill out the forms upon reading the submitted manuscript. Student editor comments remain anonymous to the student author, and the student editor does not know who the student author is. All comments included in this paper were responses to questions on this form.

Submission Form: Research

Submission Information

Title of Submission: |
Number of Submission: |
Name of Reviewer: |

Evaluation of Quality

Use complete sentences and give reasons or examples when answering the following:

Originality

1. How is the work original or not original?
2. Would you consider this a review paper?
3. To the best of your knowledge, how does the work contribute to the field of study?
4. Does the work present new research or are the author's ideas clear within the work?

Organization

5. Does the work contain an arguable thesis that is supported throughout the body?
6. Is the information clearly organized and the arguments logical?

Research and Methods

7. Is previous relevant work acknowledged and referenced?

8. Is the research thorough and ethical and the methodology appropriate? (Remember, review papers should be extensively researched.)

9. Are reasonable conclusions drawn from the results?

Recommendations

Provide the author with constructive criticism and feedback:

10. What needs to be improved?

11. What was done well within the work?

12. Any further comments or recommendations not covered above?

This submission:

_____ Should be published without change

_____ Will be suitable for publication after minor revisions are made

_____ Requires substantial revision and must undergo the review process again before being considered for publication

_____ Is unacceptable for publication