

Article Critique

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Introduction

The paper by Barnes et al. (2020) entitled “Teachers’ epistemic cognition in situ: Evidence from classroom assessment” is a case study addressing how teachers use epistemic and non-epistemic cognition relative to assessment to support both student achievement and their own classroom practice. This research was performed to further understand these processes better. As this was a case study, they explored these ideas by observing seven fifth-grade English teachers as they engaged in assessing student work to see if current theoretical models of epistemic cognition were accurate when applied in the classroom. Furthermore, Barnes et al. revealed areas where epistemic cognition could be verbally explained by teachers, and areas where epistemic cognition are more implicit or hidden. The authors systematically and effectively support the theory and provide clear evidence for their findings, not only providing routes for future research and implications for practice, but doing so in an way accessible for readers (Barnes et al., 2020).

Summary

Research Questions

Barnes et al. (2020) set out to explore the ways in which epistemic cognition is observable during teacher assessment of student work. This was explored through teacher reflective self-talk as there was a gap in the literature regarding the ways in which teachers utilize epistemic cognition during assessment (Barnes et al., 2020).

Supporting Logic

Epistemic cognition can be defined as how we come to know things about the world. This concept has historically received less attention in the research with respect to classroom implementation than ideas such as learning and cognition. One model of epistemic cognition, the

AIR model, encompasses three main components: Aims (valuable goals attached to gaining knowledge), ideas (beliefs about knowledge used to determine if aims are achieved), and reliable processes (strategies and skills used to achieve aims). In the past, this model has been used to explore some aspects of preservice and in-service teachers' development of epistemic cognition and how it theoretically impacts their work, but very little understanding how it appears in context. In addition, the authors address that epistemic cognition in theory impacts assessment, and illustrate this interaction through a description of the assessment triangle. This model is composed of three parts: Cognition (subject matter knowledge), observation (concepts about tasks regarding how students will demonstrate understanding), and interpretation (the tools and strategies used to make conclusions from observations). All three components must work together to be effective, and epistemic cognition has been shown through research to impact all components (Barnes et al., 2020).

Ultimately, teachers have to use their own epistemic cognition to understand what students know when they engage in assessment. When the AIR model and assessment triangle are properly integrated, teachers are able to fully integrate theory and practice into praxis. To explore this, this paper focuses on teachers during assessment, when prior research has mainly examined teachers as learners, or learners themselves, with respect to epistemic cognition. Furthermore, the systematic qualitative analysis of teacher epistemic cognition allows the authors to paint a deep, detailed picture of the information missing in the literature, as well as how this information emerges in the classroom (Barnes et al., 2020).

Methods Utilized

The authors engaged in a qualitative case study of seven fifth-grade English-Language Arts teachers from five different northeastern U.S. schools. These participants were all White,

mostly female ($n = 5$), 25-61 years old, and ranged from having 4-12 years of teaching experience. All were identified as expert participants, and across them they used three different curricula in their classrooms. Three used “Teachers’ College Reading and Writing Workshop,” where students engaged in mini-lessons, major weekly assignments assessing understanding, and frequent conferences with teachers. Three teachers used a blended approach, using ideas from multiple curricula, and implementing conferences weekly to assess student skills, note observations, and give feedback; these are paired with weekly spelling and vocabulary assignments. The last teacher used a Basal Reader Program, focusing on weekly vocabulary assessments, spelling tasks, and flash cards to enhance student phonics and word attack. A bounded context was used for data collection. Teachers participated in an initial interview; then over two weeks observations, think-aloud interviews, and artifacts were collected; and at the end of the year a closing interview was performed. Data were examined through thematic analysis and emergent coding (Barnes et al., 2020).

Results

The authors discovered epistemic cognition emerging when all participating teachers engaged in classroom assessment, and that the components of the AIR model worked in tandem with the other components. They also noted that these components did not always represent engagement in epistemic cognition, and the context in which the component was observed determined what was represented. With respect to aims, the authors discovered teachers setting knowledge-focused goals for their students with respect to content knowledge. They also set knowledge-focused goals for themselves with respect to understanding what their students knew. Non-epistemic aims included how students formatted or turned in their homework, or how

quickly the teacher was able to complete grading tasks; these goals were not related to knowledge and so not epistemic (Barnes et al., 2020).

Barnes et al. (2020) also observed teachers engaging in epistemic and non-epistemic ideals. Primarily, these emerged through rubrics and other means where standards for grading were represented, where students were assessed on beliefs and understandings about content knowledge emerging from student work. Ideals also emerged non-epistemically for other grading criteria unrelated to knowledge, such as formatting. Epistemic and non-epistemic reliable processes were observed. These were promoted by teachers for students to help them meet aims, and teaching students to use these strategies also met epistemic teacher aims and supported teacher ideals, showing the components working together. Non-epistemic strategies were also used, such as color-coding, and the authors acknowledged how the context in which these reliable processes were used determined if they were or were not epistemic (Barnes et al., 2020).

Barnes et al. (2020) also examined the epistemic ends that emerged from their data collection. Epistemic stances, for instance, were demonstrated when teachers achieved a knowledge-related aim they set for themselves. Epistemically-informed praxis also was an end that emerged when teachers used the results of their epistemic cognition to inform their teaching going forward. Non-epistemic ends were also identified, but not as heavily emphasized in the paper beyond being presented as a counter-example. The authors followed this with a microanalysis of their experience working with one teacher to illustrate all of their findings as they appeared in action to demonstrate utility and practicality of the results (Barnes et al., 2020).

Implications

The authors engaged in this case study with the aim of examining how teachers use epistemic and non-epistemic cognition when assessing student work. Their first contribution was

the evidence they presented showing teachers do engage in epistemic cognition during assessment, confirming pre-existing theories. They also showed how teachers had to use all components of the AIR model and the assessment triangle to learn from their assessments of student work to contribute to their praxis. In addition, the authors contributed to the idea that, in practice, epistemic cognition is founded on different teacher goals throughout the entire enactment of the AIR model, and that these goals may intersect and interact over time. Finally, the authors contributed the understanding that context did indicate that non-epistemic processes were also used in tandem with epistemic cognition during assessment (Barnes et al., 2020).

Analysis and Critique

Theory

The authors brought a couple of different theoretical perspectives together with this article. To do so, they systematically broke down each theory--both the AIR theory as well as the assessment triangle--and the prior research supporting each. Not only in this context was each portion of each theory explained and the utility of each presented, it was also clarified the settings in which each idea had been previously explored. This set the foundation for their illustration of where the gap in the literature existed, and why exploring this gap would be useful for both researcher understanding and practitioner implementation. The systematic presentation of the prior literature, the gap in the literature and the existing research problem, and the presentation of the purpose of the study and its research question aiming to address this gap make the theory accessible to the reader. The result is an airtight theoretical underpinning to the authors' presented study (Barnes et al., 2020).

Methods

The authors present the logic for their decision to use an instrumental case study design. While their logic does make sense, it is difficult in some ways for the reader to understand from their description how their design differs from a phenomenological study design. In fact, their description of an instrumental case study in some ways sounds similar to a description of descriptive phenomenological analysis. This is especially so as the authors seek, not to make inferences about or interpretations of the teachers' use of epistemic cognition, but instead describe what teachers do when using epistemic cognition and describe how that emerges. The authors would do well to explain why they chose the method they did in more detail to differentiate their chosen method from other similar methods, and the advantages lent to them due to their decision (Barnes et al., 2020).

With respect to participants, the authors were very clear that, due to the nature of their research question, they aimed to just work with expert participants to ensure high-quality data. In detailing their selection process, they explained their use of two separate two-gate processes utilized during recruitment. This strict process was not only clarified well, but also matches with their aim and supports the integrity of their data. However, it would be potentially helpful for the authors to address in more detail the educational settings in which their participants taught. For instance, Jefferson Elementary School is noted as having a faculty-student ratio of 1:1; this ratio is highly different from the other participating schools, and could easily be a typo, but this is not clear. In addition, Adams Intermediate School only encompasses two elementary grades and has a comparatively high incidence of students identified as having disabilities. Their educational setting likely influences the curriculum they or their school has chosen to use, which itself may not only be a form of epistemic cognition, but those differences in curricula themselves may also impact epistemic cognition further. This is not thoroughly addressed by the authors, and would

be helpful to the reader seeking to understand the context of the results further (Barnes et al., 2020).

Finally, in describing how data was handled, the authors discuss the use of naturalized transcription. They provide well-rounded and understandable rationale for doing so, and it primarily seems that the focus was on the accessibility of reading the results for the individuals coding the material by removing filler words and sounds, as well as adding punctuation. This makes sense as ease of coding and accessibility of data is vital to be able to provide interpretation. In some ways, without their naturalization of the data, it could have even been seen as noisy. That being said, by making those changes, there is a high volume of lost information and subtext not addressed. Furthermore, with their talk-aloud protocol, if teachers were struggling to articulate what they were thinking, artifacts such as pauses, stutters, filler words, and run-on sentences could be helpful in understanding the epistemic processes the teachers were engaging in. It would be useful to understand more about why the researchers decided to naturalize their data despite these drawbacks, and why they felt accessibility outweighed these concerns (Barnes et al., 2020).

Analysis

The authors chose to examine their data with the use of thematic analysis. This decision is well-supported, and aligns well with the study aims of exploring the lived experiences of teachers involved in the phenomenon of using epistemic cognition. Their chosen study design and this data analysis method work together well. It is also helpful to the reader the detail in which the researchers outline how they engaged in thematic analysis. In particular, they draw attention to the stage in which the literature was involved in theme establishment. This supports

validity of the findings, and is helpful to acknowledge for the reader as this is not always discussed in this manner in qualitative studies (Barnes et al., 2020).

Validity is also further addressed by the researchers with respect to counter-examples. The heavy emphasis the authors place on non-epistemic cognition paints a clearer picture of all of the moving parts in the assessment process, and allows the learner to better understand the role epistemic cognition plays in classroom assessment. The quotes chosen by the authors support their data well, and it is helpful for the flow of the piece that longer quotes were chosen and placed in the writing, and then used to exemplify a larger picture of epistemic cognition in context. Finally, the manner in which the results are systematically presented is helpful as they work to provide evidence for each component of the AIR model, then within this is broken down between teachers using epistemic cognition to help students versus teachers using epistemic cognition for themselves, and finally examples and counter-examples. Ultimately, the researchers are effective in their presentation of their results (Barnes et al., 2020).

Discussion

The authors repeat a writing habit in their discussion section helpful to the reader: they provide an organized paragraph in advance to let the reader know what they are about to encounter and the main take-away points of each section. This systematic descriptive nature of their discussion's introduction and the following sections make their conclusions accessible to the reader. In addition, the four points they introduced were discussed in the order they presented, and then each was broken down to acknowledge epistemic cognition for assessing student learning and teacher-focused cognition. At each stage, the researchers ensured they addressed remaining gaps they were not able to explore. These gaps were again reiterated and expounded upon during their implications section. Despite this, the limitations section of this

paper was lacking: they addressed the small size of the study and how its qualitative nature may not ensure generalizability of the study. However, these are very surface-level limitations, and as discussed earlier more limitations can be observed. This does not discount the study's importance, but these drawbacks do need to be addressed in more detail (Barnes et al., 2020).

Implications

Research

Overall, the research performed here has great value as it fills a well-defined void in the literature. It is notable that teachers articulated some parts of their thought more often than others, especially with respect to epistemic cognition. It seems worthy for future research to not only explore why this is, but also does it differ between individuals what portions of they thought they are able to articulate more easily, as well as how to externalize the portions of epistemic cognition that are normally internalized. If it can be explored how to better externalize teachers' aims and ends--the portions noted to be less often verbalized--those aspects of epistemic cognition can be better explored in future research. The authors also note that epistemic and non-epistemic processes seemed to interact. That being said, this study did not delve into this idea, and more work is needed to understand how these processes interact, support, and inhibit each other for the optimization of student learning. Furthermore, why teachers choose to use different processes in different contexts would be worthwhile (Barnes et al., 2020).

Practice

Overall, this study provides insight for practitioners into how they assess student learning. This understanding provides educators with the tools to better understand how they teach and can harness epistemic cognition to benefit themselves in their praxis, and ultimately their students and their growth. Even more important is the acknowledgement of both epistemic

and non-epistemic cognition by the authors in the examination of their data. Though they did not delve and instead left this for future research, they briefly looked at how the two types of cognition overlapped, complemented each other, and worked against each other. While more research is needed to understand these ideas, even this brief insight has implications for how teachers can work most effectively, as well as engage in the best praxis for their students to learn most effectively (Barnes et al., 2020).

References

- Barnes, N., Fives, H., Mabrouk-Hattab, S., & SaizdeLaMora, K. (2020). Teachers' epistemic cognition in situ: Evidence from classroom assessment. *Contemporary Educational Psychology, 60*, 101837. <https://doi.org/10.1016/j.cedpsych.2020.101837>