



## Effectiveness of a Peer-Based Tutoring Intervention to Promote Freshmen Evaluation of Information Sources

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Martina Capurro, Mônica Macedo-Rouet and Gaston Saux

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### Abstract (55 words)

A sample of freshmen undergraduates ( $n = 127$ ) received an intervention to promote the critical evaluation of Internet sources in one of two versions: asymmetric (expert instructor) or symmetric (peer mentor). Both groups outperformed a control group (no intervention). Additionally, the symmetric modality showed greater gains and more intense epistemic emotions than its asymmetric counterpart.

**Keywords:** source evaluation, intervention, teaching modality, peer mentor, epistemic emotions

### Summary (1168 words)

Evaluation is a core process in multiple-document reading by which readers assess the relevance and reliability of information for fulfilling task demands (Rouet & Britt, 2011). Evaluation can focus on the contents or the sources (i.e., the origin of the information), with the latter being pivotal when readers have low-prior topic knowledge and encounter conflicting information (Stadtler & Bromme, 2014). Source evaluation can be fostered by educational interventions that explicitly teach students methods for evaluating sources (Kammerer & Brand-Gruwel, 2020). However, a review of the literature concluded that gains in source evaluation were limited to application tasks (Brante & Strømsø, 2018). In other words, students seldom apply sourcing knowledge beyond tasks that mimic the exercises completed during the learning phase. One possible explanation for this “lack of transfer” is that students do not cognitively and affectively engage with sourcing evaluation (List & Alexander, 2017).

We propose that the efficacy of sourcing interventions can be enhanced by teaching methods that not only promote evaluation strategies but also consider the modality through which they intend to promote them (who teaches them, in what context, when, and how they intend to apply them). Compared to an expert instructor, a peer can share experiences and make use of a common sociolect, thus reducing the discrepancy between the educational context and what is to be taught. It could also decrease feelings of social distance (Vahedi et al. 2018). Mentoring is one type of interaction between peers (South et al., 2017). A peer-mentor acts as a more advanced promoter of the personal or professional development of the other peer (e.g., a senior student tutoring a freshman). Thus, we hypothesize that an intervention based on a peer-mentor modality (symmetric hereafter) will be more efficient to promote critical evaluation of sources when reading for informational purposes as compared to an expert-instructor modality (asymmetric hereafter). Furthermore, we hypothesize that the symmetric modality will support the affective component associated with critical reading tasks, as compared to the asymmetric modality. Thus far, interventions in the area have focused on the cognitive dimension. Moreover, studies comparing the efficacy of the same intervention in different modalities are scarce. With this in mind, we compared the effectiveness of a symmetric and an asymmetric modality to promote critical evaluation of information sources in Internet reading tasks among beginning-level college students.

### Method

#### *Participants*

127 freshmen in the social and human sciences from a large South American university (85.8% female,  $M = 19.52$  years,  $SD = 2.79$ ).

### *Design*

Quasi-experimental, with pre-post measurements and control group. Courses were randomly assigned to one of three conditions: symmetric intervention, asymmetric intervention, or control group (i.e., no intervention).

The intervention was carried out by the first author. Intervention's modality (asymmetric, symmetric) was manipulated by varying three dimensions: a) spatiality (Asymmetric: facing participants at a distance of 2 meters; Symmetric: tutor and participants seated in round and at a distance of 45 cm), b) homophily statements (Asymmetric: presentation of the instructor as a professional in the subject and of workshops as "classes" with fictitious examples for explanatory purposes; Symmetric: presentation of the instructor as a senior student and of workshops as situations derived from her own experiences and concerns in the use of the Internet), and c) example-based learning in both modalities, but the symmetric modality relied on an interactive variant (reading aloud the examples together, promoting self-explanations and collaborative summarization), and the asymmetric modality on an expository-demonstrative variant (reading aloud, explicit teaching and pre-structured summary by the intervener). The control condition completed the pre-and post-tests, respecting the time lapses but without receiving an intervention.

### *Materials*

The intervention consisted of three 60-minute training workshops, plus two additional meetings for pre- and post-measurements (Martinez et al., 2023; Pérez et al., 2018). The workshops posed situated tasks (e.g., health risks of electromagnetic waves), using SERP results and multiple pre-selected documents as examples. Each workshop built on the precedent and focused on one of three critical dimensions to assess the reliability of Internet sources: author experience, author motivation, and publication medium quality.

Three pre-post measurements were used. First, a knowledge application task (KA) which, similar to the training exercises from the workshops, asked participants to assess the trustworthiness of 9 SERP links, four high and four low in trustworthiness plus one filler, on a 5-point Likert-type scale. The dependent variable was the mean score for each link type. Second, an implicit transfer task (IT) asked participants to write an argumentative essay after reading two conflicting texts (each associated with a high or low-trust source). The dependent variable was the spontaneous mention of sources in the essay (present, absent). Third, an explicit transfer task (ET) asked participants to indicate and justify which of the conflicting texts seemed better. The dependent variables were text selection (high-trust source vs. other responses), and the inclusion of source criteria in the selection's justification (present, absent).

Finally, affective engagement was measured by the Epistemic Emotions Scale (i.e., emotions associated with acquiring knowledge in a task, Pekrun et al., 2017) and a situational interest scale (List et al., 2018), which participants responded at the end of each of the three intervention workshops.

### *Procedure.*

The pre-test was completed in groups of up to 30 people. Several meetings were coordinated to carry out the three workshops in groups of 5 participants maximum (except for controls). The post-test was completed one week after the last workshop.

### *Statistical analyses*

Performance analyses included the gains (i.e., differences) between post- and pre-tests as outcomes, whereas affective engagement analyses were run separately for each workshop. In all cases, Modality (asymmetric, symmetric, control) was the fixed factor. Continuous outcomes (KA task and affective scales) were analyzed via MANOVAs and binomial

outcomes (mention of sources in the essays, text selection, and source criteria use in the justifications) via logistic regressions.

### Results & Discussion

The groups did not differ initially,  $p > .367$ . Regarding post-pre gains, the KA task was affected by Modality, *Pilai's trace*=0.25,  $F(4, 248)=8.82$ ,  $p<.001$ . Both intervention groups outperformed controls when assessing bad-quality links, adj. Bonf.:  $p's<.001$ . For good quality links, only the asymmetric modality showed significant gains,  $p's<.025$ . Modality did not affect performance in the IT task:  $X^2(2, N=127)=0.52$ ,  $p=.771$ , nor text selection in the ET task,  $X^2(2, N=127)=0.30$ ,  $p=.220$ . Differently, it affected justifications in the ET task,  $X^2(2, N=127)=10.71$ ,  $p=.005$ , with the symmetric modality using source-based justifications more often (84.6%) than the asymmetric modality (70.6%) and controls (48.6%). Finally, Modality also influenced the report of epistemic emotions in the final workshop (nr. 3), *Pilai's trace*=0.26,  $F(8,56)=2.48$ ,  $p=.022$ . Participants in the symmetric modality reported more surprise and confusion than in the asymmetric modality,  $p<.001$ .

Overall, both intervention modalities outperformed controls, except for the implicit measure. In addition, both modalities differed, both in the performance and affective indicators, with the symmetric modality showing greater gains (KA and ET tasks) and more intense epistemic emotions (workshop nr. 3) than its asymmetric counterpart. These results are partially consistent with the initial hypothesis. A supplementary cohort and the recollection of ecological, far transfer indicators are planned for the following semester.

### References

- Brante, E. W. & Strømsø, H. I. (2018). Sourcing in text comprehension: A review of interventions targeting sourcing skills. *Educational Psychology Review*, 30(3), 773-799. <https://doi.org/10.1007/s10648-017-9421-7>
- Kammerer, Y., Brand-Gruwel, S. (2020). Trainings and Tools to Foster Source Credibility Evaluation During Web Search. In: Fu, W., van Oostendorp, H. (eds) *Understanding and Improving Information Search. Human-Computer Interaction Series*. Springer, Cham. [https://doi.org/10.1007/978-3-030-38825-6\\_11](https://doi.org/10.1007/978-3-030-38825-6_11)
- List, A., Stephens, L.A. & Alexander, P.A. (2018). Examining interest throughout multiple text use. *Reading and Writing*, 32, 307-333. <https://doi.org/10.1007/s11145-018-9863-4>
- List, A., & Alexander, P. A. (2017). Cognitive affective engagement model of multiple source use. *Educational Psychologist*, 52(3), 182-199.
- Martínez, M., Londra, F., Saux, G., & Burin, D. (2023, July). *Effects of a source evaluation intervention on sourcing skills: Replication and extension*. [Conference presentation]. ST&D 33rd annual meeting, Oslo, Norway. <https://easychair.org/smart-program/STD2023/2023-06-28.html>
- Pekrun, R., Vogl, E., Muis, K. R., & Sinatra, G. M. (2017). Measuring emotions during epistemic activities: the Epistemically-Related Emotion Scales. *Cognition and Emotion*, 31(6). <https://doi.org/10.1080/02699931.2016.1204989>
- Pérez, A., Potocki, A., Stadler, M., Macedo Rouet, M., Paul, J., Salmerón, L. & Rouet, J. F. (2018) Fostering teenagers' assessment of information reliability: Effects of a classroom intervention focused on critical source dimensions. *Learning and Instruction* (58), 53-64. <https://doi.org/10.1016/j.learninstruc.2018.04.006>
- Rouet, J. F., & Britt, M. A. (2011). Relevance processes in multiple document comprehension. In : G. Schraw, M. T. McCrudden, & J. P. Magliano, (Eds.), *Text relevance and learning from text* (pp. 19-52), IAP.

- Stadtler, M., & Bromme, R. (2014). The content–source integration model: A taxonomic description of how readers comprehend conflicting scientific information. In: D. Rapp, & J. Braasch (Eds.), *Processing inaccurate information: Theoretical and applied perspectives from cognitive science and the educational sciences* (pp. 379-402), MIT Press.
- South, J., Bagnall, A. & Woodall, J. (2017). Developing a typology for peer education and peer support delivered by prisoners. *Journal of Correctional Health Care*, 23 (2), 214-229. <https://doi.org/10.1177/1078345817700602>
- Vahedi, Z., Sibalis, A. & Sutherland, J. E. (2018). Are media literacy interventions effective at changing attitudes and intentions towards risky health behaviors in adolescents? A metaanalytic review. *Journal of adolescence*, 67, 140-152.