Facilitating Critical Evaluation Skills Through Content Creation: Empowering Adolescents as Readers and Writers of Online Information

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STATEMENT OF THE PROBLEM

Is it possible to teach adolescents how to think more critically about online information by having them construct online content?

Why is this important?

- The reliance on the Internet as a source of information
- The questionable nature of online content
- The failure of students to critically evaluate online information

THEORETICAL FRAMEWORKS

Critical Literacy (Friere, 1970; Freebody & Luke, 1990; Lankshear & Knobel, 1998; Luke, 2000)

New Literacies (Coiro, Knobel, Lankshear, & Leu, 2008; Leu, O'Byrne, Zawilinski, McVerry, & Everett-Cacopardo, 2009; Leu et al., 2011)

Cognitive Apprenticeship (Brown, Collins, & Duguid, 1989; Collins, Brown, & Newman, 1989)

PREVIOUS RESEARCH

Critical Evaluation (Taylor, 1986; Tate & Alexander, 1996; Brem, Russell, & Weems, 2001; Judd, Farrow, & Tims, 2006; Metzger, 2007; Killi, Laurinen, & Martunen, 2008)

Multimodal Design (New London Group, 2000; Kress & Van Leeuwen, 2001; Jewitt, 2008)

Dispositions (Zimmerman & Bandura, 1994; Baker & Wigfield, 1999; Guthrie & Wigfield, 1997; Carr & Claxton, 2002)

Defining Critical Evaluation

The critical thinking abilities used to: 1) question, analyze, and compare resources; 2) judge the quality of information on various characteristics; and 3) defend an opinion with evidence from multiple sources and prior knowledge (Coiro, 2008)

- Credibility is defined in terms of expertise and trustworthiness or the reliability of information (Judd, Farrow, & Tims, 2006; Coiro, 2008; Kiili, Laurinen, & Marttunen, 2008)

- Relevance is defined in terms of importance and currency, or judgments about the essential nature of information, especially in relation to the task (Judd, Farrow & Tims, 2006; Coiro, 2008; Kiili, Laurinen & Marttunen, 2008)

Four Research Questions

RQ1. What are the estimates of reliability and validity obtained from the construction and validation of a critical evaluation instrument that measures the critical thinking skills of adolescents, as they read online?

RQ2. Does an instructional model that teaches the critical evaluation and construction of online content with varying levels of sincerity improve the critical thinking skills of adolescents as identified on the measure of critical evaluation validated in this study?

RQ3. Does an instructional model that teaches the critical evaluation and construction of online content with varying levels of sincerity improve student scores on an assessment that measures their dispositions of online reading?

RQ4. What are the themes and patterns that exist as groups of students comprehend and construct online information in a one-to-one laptop classroom?

THE INSTRUCTIONAL MODEL

A three-phase model of instruction, based on principles of cognitive apprenticeship

- Phase I: Students analyze the techniques authors use to make websites credible (Britt & Gabrys, 2002; Fogg, Marshall, Laraki, Osipovich, Varma, Fang, et al., 2001)
- Phase II: Students construct websites while manufacturing markers of online sincerity (Brem, Russell, & Weems, 2001)
- Phase III: Students reflect on the knowledge & strategies used while critically evaluating & constructing online information (Collins & Brown, 1988; Collins, Brown, & Newman, 1989)

SETTINGS & PARTICIPANTS

A convenience sample of two groups of seventh grade students and teachers from an economically challenged school in Connecticut

- Intervention Group (n = 107)
- Control Group (n = 90)

Qualitative data collected from the "top performing" groups of students in the treatment group

RESEARCH QUESTION 1

What are the estimates of reliability and validity obtained from the construction and validation of a critical evaluation instrument that measures the critical thinking skills of adolescents, as they read online?

Major Dependent Variable

- Critical Online Information Literacies (COIL) instrument

Four-step Process of Validation of the COIL

- 20 multiple-choice items developed & content validated by panel of experts
- Initial descriptive analysis of data & findings of the COIL
- An Exploratory Factor Analysis (EFA) conducted on the dataset
- Reliability testing conducted to estimate the consistency of items to constructs

RESULTS OF RESEARCH QUESTION 1

Content Validation of Experts

- Items identified by 90% of participants kept for further analysis. Content Validity Index (CVI) for each item needed to exceed 2.70.

Descriptive Analysis

- Demonstrated that in a majority of items students able to answer correctly than incorrectly. Several items had more students answering incorrectly than correctly.

Exploratory Factor Analysis

- Root Mean Square Error of Approximation (RMSEA) indicated a two-factor extraction. Loadings & Estimated Residual Variance (ERV) indicated two factor were slightly negatively correlated. Geomin Rotated Loadings indicated that some items loaded minimally, negatively, & sometimes equally on the two factors. ERV also indicated large amount of unexplained residual variance.

Testing of Reliability

- Inspection of Cronbach's alpha & inter-item correlations matrix used to delete Items 5, 6, 11, 14, 16, & 18 of the COIL. Cronbach's alpha for Scale One (credibility) was 0.19; Scale Two (relevance) was -0.04. Because the two values did not exceed the threshold of 0.70 the scales were shown to not be reliable.

RESEARCH QUESTION 2

Does an instructional model that teaches the critical evaluation and construction of online content with varying levels of sincerity improve the critical thinking skills of adolescents as identified on the measure of critical evaluation validated in this study?

Major Dependent Variable

- Critical Online Information Literacies (COIL) instrument

Instructional Model

- Three phase model guided by modeling, coaching and fading

Analysis

- Item-Level Binary Logistic Regression

RESULTS OF RESEARCH QUESTION 2

The item level analysis of the COIL indicated three distinct groups of odds ratio loadings

- High odds ratio, statistically significant. Items 1 & 2 (credibility), Item 19 (relevance)
- High odds ratio, not significant (Items 3, 4, 6, 7, 9, 11, 15, 16, 17, 18, 20)
- Low odds ratio, not significant (Items 5, 8, 10, 12, 13, 14)

The items that loaded as significant were also the ones that were the focus of the instructional model.

Research Question 3

Does an instructional model that teaches the critical evaluation and construction of online content with varying levels of sincerity improve student scores on an assessment that measures their dispositions of online reading?

Major Dependent Variable

- Dispositions of Online Reading Comprehension (DORC)

Instructional Model

- Three phase model guided by modeling, coaching and fading

Analysis

- Repeated Measures Analysis of Variance (RM-ANOVA) to test interaction between Group and Time (pretest-posttest)

RESULTS OF RESEARCH QUESTION 3

Validity Testing of the DORC

- Critical Stance divided into CS up, and CS down.
- The scales tested to ensure they were acceptable for use in research: reflective thinking (RT), critical stance down (CS Down), collaboration (CO), flexibility (FL), and persistence (PE). CS Up did not reach acceptable levels of 0.70.

RM-ANOVA

- RT: test of interaction not significant ($F = 0.00$, $p = 0.99$)
- CS Down: test of interaction significant ($F = 8.84$, $p = 0.00$)
- CO: test of interaction not significant ($F = 0.80$, $p = 0.37$)
- FL: test of interaction not significant ($F = 2.17$, $p = 0.14$)
- PE: test of interaction not significant ($F = 1.07$, $p = 0.30$)

RESEARCH QUESTION 4

What are the themes and patterns that exist as groups of students comprehend and construct online information in a one-to-one laptop classroom?

Qualitative data collection

- Top performing groups of students purposely sampled
- Interviews of student groups, researcher notes, and analysis of student work-products collected from purposely sampled groups of students

Instructional Model

Analysis

- A multi-step process to inductively analyze and ultimately develop themes from the data
- Triangulation of findings using three data sources (Denzin, 1978)

Results of Research Question 4

Stage One Themes

Stage Two Themes

- Ways in which the ability to recognize and construct surface level markers of credibility and relevance might have been enhanced or impeded
    - Maricruz: A more successful case
    - Alejandro: A less successful case
- Ways in which the dispositions of critical stance and healthy skepticism might have been enhanced or impeded
    - Jazmine: A more successful case
    - Noel: A less successful case

LIMITATIONS

- A longer period of time for the instructional model may have provided different results.

- Prior abilities or experiences of the students may have affected results. Students as informants in "top performing" groups a possible limitation of results.

- Prior abilities or experiences of the instructor, and researcher may have affected results. Researcher as participant observer may have affected results.

- The culture of the economically challenged school and classroom may have affected results.

- Prior testing and validation of the Critical Online Information Literacies (COIL) instrument may have produced different results.

DISCUSSION

- A student's ability to recognize and construct surface level markers of credibility and relevance can be enhanced, and the dispositions of critical stance and healthy skepticism can also be improved.

- Continued research & development of assessments of online literacies are needed.

- Research needs to be conducted to fine-tune the instructional model & assessments to determine other constructs that may be involved, or allow all students to benefit.

- Research needs to be conducted to further understand the knowledge, skills, and dispositions involved in online content construction.

- Research is needed to understand the factors involved as students work individually and collaboratively online.

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