Factors associated with senior level student’s integration of course content in online discussion

Nancy L. Novotny, PhD, RN, CNE
Mennonite College of Nursing

Elahe Javadi, PhD
School of Informatics
The learner will be able to:

- Describe the importance of integrating information in the decision making process.
- Explain the potential negative influence of selective exposure behaviors.
- Discuss relationships that exist between familiarity with sources of information, preconceptions about likely usefulness of information, selective exposure behaviors, and quality of information integration.

Support:

We thankfully acknowledge funding to support this work from an Illinois State University Research Grant and a SoTL Research Mini-Award.
Overview

Background
  Background, Problem, and Review of Literature
  Purpose

Design, Methods, and Sample

Results
  Familiarity with Peers
  Discussion Posts and Selective Exposure
  Preconceptions about Usefulness of Peers’ Information
  Quality of Information Integration in Discussions

Conclusions and Implications
Background and Problem

Asynchronous Online Discussions (AOD)
- Facilitate students’ exploration and understanding of course content
- Expose students to diverse perspectives which is expected to help them make associations among dimensions of content

Information integration
- Involves making associations between dimensions of a topic
- Enables creation of well-reasoned conclusions (Gruenfeld & Hollingshead, 1993)
- An essential skill for nurses to:
  - Make decisions based on multi-source, diverse information
  - Present a coherent case for decisions and recommendations
- Factors influencing information integration is not well understood
Often minimal high cognitive ability demonstrated in AOD

- Despite easy access to diverse information and value of discussions
- Purposeful use of strategies in AOD are beneficial (Novotny, et al., 2016)
- Even with best results, 20-40% do not display high levels of cognition in AOD regardless of strategy used (Richardson & Ice, 2010)

Student-related factors or behaviors that lead to poor cognitive abilities or decision-making have not been well explored in AOD environments in nursing
Review of the Literature

Selective exposure
- An individual’s tendency to attend to and process only confirmatory information
- Persistent obstacle to information integration and making effective decisions (Fischer, Schultz-Hardt, & Frey, 2008; Fischer & Greitemeyer, 2010)

Posts read in AOD
- Helps predict student learning in general (Goggins & Xing, 2016)
- Factors influencing students’ post-reading behaviors are largely unknown
Familiarity with source of information

- Influences cognitive processes in groups:
  - Familiar groups share information more effectively, while unfamiliar groups integrate information more effectively (Gruenfeld, et al, 1996)
  - Thus, familiarity of source may impact choices about which information students pay attention to

Preconceptions about usefulness of information

- For information integration to occur, individuals need to positively evaluate information shared by group members (Sussman & Siegal, 2003)
  - In some conditions, perceived utility influences the online information a student attends to, superseding selective exposure behavior (Knobloch-Westerwick & Kleinman, 2012)
Preconceptions about Usefulness of Information (that Peers share in Discussions)

Student-to-Peer Familiarity (with Source of Information)

Posts Read

Selective Exposure Behavior

Quality of Information Integration (in final posts)

Hypothesized + influence

Hypothesized − influence
Purpose

Test a framework based on prior work (Javadi & Novony, 2016) to explore student-related factors that influence integration of information—a necessary component of decision making—within the context of nursing education in online course content discussions.
Design and Methods

**Design:** Descriptive comparative field study

**IRB approved:** Obtained written consent

**Setting**
- Blended undergraduate leadership course
- During last semester of prelicensure program
- Online discussions posed a statement about a major course topic
  - **1st post:** Provide initial argument supporting agreement or disagreement
    - Required to read a minimum of one peer’s initial post
  - **Final post:** Free to modify stance
    - Provide an extended analysis integrating relevant information

**Post titles:** Applied by student to indicate current stance
Design and Methods, continued

Data sources

1. Questionnaire at start & end of semester to capture:
   - Respondent’s familiarity with each peer
   - Identified up to 10 peers who share most useful information in discussions
   - Respondent’s sex

2. De-identified participant’s initial and final posts from 2 discussions
   - Coded student’s initial and final stance on each issue per title

3. Recorded which initial peer posts were read and if matched reader’s stance
   - Per students’ self-reports and verified with LMS data (Clay, Barber, & Shook, 2013)

Rated quality of information integration in final posts

Scored (1-5) by investigator not in the course and experienced using tool

Modified Integrative Complexity Measure (Baker-Brown et al, 1992)
Sample

- Included 18/23 (78%) of students enrolled
- 13 (72%) females, 5 (28%) males
  Consistent with ratio of enrolled students in class
- Two participants completed only the first questionnaire
Results
Results – *Familiarity with Peers*

Comparisons of beginning and end of semester familiarity ratings

**Figure 1.** How familiar each student was perceived to be by all peers

**Figure 2.** Each participant’s familiarity with all peers

- Familiarity with peers increased over the semester by an average of 0.3 points on scale from 1 (not at all familiar) to 5 (very familiar).
Results: *Familiarity with Peers*, continued

Summary of distribution of *most* and *least* familiar by sex

<table>
<thead>
<tr>
<th>Out of the five students:</th>
<th>Beginning</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>. . . with whom peers were <em>least</em> familiar:</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
</tr>
<tr>
<td>. . . with whom peers were <em>most</em> familiar:</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
</tr>
<tr>
<td>. . . who were <em>least</em> familiar with his/her peers:</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
</tr>
<tr>
<td>. . . who were <em>most</em> familiar with his/her peers:</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
</tr>
</tbody>
</table>

- In this small sample, familiarity rating differences by sex were more pronounced at end.
- Despite fewer males in sample, males had a higher rate of being *very familiar to* peers and a lower rate of being *very familiar with* their peers.
## Results – Discussion Posts and Selective Exposure

### Comparing: Post read, selective exposure, and change in stance

<table>
<thead>
<tr>
<th>Item</th>
<th>1st Discussion</th>
<th>End Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total posts read before final post (N=18)</strong></td>
<td>( \bar{X} = 4.1 ) (SD=4.8) \nMedian=3, (range 1-22)</td>
<td>( \bar{X} = 3.3 ) (SD=1.6) \nMedian=3, (range 1-6)</td>
</tr>
<tr>
<td>(n = 13)</td>
<td>( \bar{X} = 4.6 ) (SD=5.5)</td>
<td>( \bar{X} = 3.7 ) (SD=1.5)</td>
</tr>
<tr>
<td>(n = 5)</td>
<td>( \bar{X} = 2.6 ) (SD=1.5)</td>
<td>( \bar{X} = 2.2 ) (SD=1.3)</td>
</tr>
<tr>
<td><strong>Read only opposite stance posts</strong></td>
<td>3 (17%)</td>
<td>3 (17%)</td>
</tr>
<tr>
<td><strong>Selective exposure – tendency R(^1)</strong></td>
<td>10 (58%)</td>
<td>7 (39%)</td>
</tr>
<tr>
<td><strong>Selective exposure - full R(^2)</strong></td>
<td>4 (22%)</td>
<td>3 (17%)</td>
</tr>
<tr>
<td><strong>Changed stance position (side)</strong></td>
<td>2 (11%)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Changed stance degree, not side</strong></td>
<td>1 (6%)</td>
<td>1 (6%)</td>
</tr>
</tbody>
</table>

\(^1\) Tendency for selective exposure: > 50% of posts read matched stance

\(^2\) Full selective exposure: 100% of posts read were same as own stance
Comparisons of post read, selective exposure, and change in stance

- Fewer students read a large number of posts in final discussion than 1st.
- Males read fewer posts in both discussions.
- There was a trend to read posts of more familiar students ($p=.07$).
- 2 students changed stance (ex: from agree to disagree) in 1st discussion and none in the final; 1 changed degree of stance in 1st and final.
- Familiarity with a peer was associated with the tendency for ($p=.03$) and engagement in full selective exposure ($p=.02$) behaviors.
- Selective exposure decreased between 1st and final discussions.
At the beginning and end of the semester, participants were asked to identify up to ten peers who frequently share the most useful information during course discussions. 

At the beginning of the semester, one student perceived 10 peers to frequently share useful information, compared to three students at the semester’s end.

R3 At the beginning and end of the semester, participants were asked to identify up to ten peers who frequently share the most useful information during course discussions.
Results – *Perceived Usefulness of Information Peers Share in Discussions*, continued

Number of students identified as sharing most the useful information by respondent’s sex \( R^3 \)

<table>
<thead>
<tr>
<th>Respondent’s sex</th>
<th>Beginning ( X^- (SD) )</th>
<th>End ( X^- (SD) )</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="female.png" alt="Female" /> n = 12</td>
<td>6.9 (2.0)</td>
<td>7.6 (2.3)</td>
</tr>
<tr>
<td><img src="male.png" alt="Male" /> n = 4</td>
<td>6.5 (2.5)</td>
<td>5.25 (1.9)</td>
</tr>
</tbody>
</table>

- Trends differed over semester by respondent’s sex:
  By semester’s end, females identified more peers who shared useful information, whereas males identified fewer peers.

**R3** At the beginning and end of the semester, participants were asked to identify *up to ten* peers who frequently share the most useful information during course discussions.
Results – *Perceived Usefulness of Information Peers Share in Discussions, continued*

- Perceived usefulness of a peer’s information did *not* demonstrate an association with engagement in selective exposure behaviors.
- Perceived usefulness was positively associated with reading a peer’s post ($p < .001$).
Results – Quality of Information Integration

Quality of Integration $R^4$ between Initial and End of Discussion Posts

<table>
<thead>
<tr>
<th>Sample</th>
<th>Initial</th>
<th>Final</th>
<th>$p$</th>
<th>Initial</th>
<th>Final</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 18</td>
<td>3.6 (1.2)</td>
<td>3.8 (1.1)</td>
<td>.64</td>
<td>3.4 (1.0)</td>
<td>4.1 (1.2)</td>
<td>.05</td>
</tr>
<tr>
<td>n=13</td>
<td>3.5 (1.2)</td>
<td>3.6 (1.2)</td>
<td>.70</td>
<td>3.4 (1.0)</td>
<td>4.2 (1.3)</td>
<td>.08</td>
</tr>
<tr>
<td>n=5</td>
<td>4.0 (1.3)</td>
<td>4.2 (0.8)</td>
<td>.83</td>
<td>3.4 (0.9)</td>
<td>4.0 (1.3)</td>
<td>.47</td>
</tr>
</tbody>
</table>

- All posts were rated $\geq 2$ on the scale.
- Quality increased between initial and final posts.
- Quality higher in 2nd discussion with females contributing the most to this increase.

$R^4$ At Ratings could range from $1 =$ superficial argument with emphasis on value statements/personal opinion to $5 =$ understands both sides of argument; strong analysis and justifications to reject one side and support other.
Results – Quality of Information Integration, continued

Quality of Integration $R^4$ by Selective Exposure

<table>
<thead>
<tr>
<th>Item</th>
<th>1st Discussion</th>
<th>2nd Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selective exposure - tendency R1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>$\bar{x} = 3.7$ (SD=1.1)</td>
<td>$\bar{x} = 4.0$ (SD=1.4)</td>
</tr>
<tr>
<td>Not Present</td>
<td>$\bar{x} = 3.9$ (SD=1.2)</td>
<td>$\bar{x} = 4.2$ (SD=1.2)</td>
</tr>
<tr>
<td>Selective exposure – full R2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>$\bar{x} = 3.0$ (SD=.8)</td>
<td>$\bar{x} = 3.7$ (SD=1.5)</td>
</tr>
<tr>
<td>Not Present</td>
<td>$\bar{x} = 4.0$ (SD=1.1)</td>
<td>$\bar{x} = 4.2$ (SD=1.2)</td>
</tr>
</tbody>
</table>

Integration quality was consistently lower in students who exhibited a tendency toward or full selective exposure in both discussions:

- Tendency = .2 pts lower in both discussions
- Full selective exposure = 1 pt lower in 1st and .5 lower in final.

$R^4$ Ratings could range from:

1 = superficial argument with emphasis on value statements/personal opinion to

5 = understands both sides of argument; strong analysis and justifications to reject one side and support other.
Conclusions
Confirmed most expected relationships in proposed model

FAMILIARITY:
Increased selective exposure behaviors AND
Indicated a trend to read posts of familiar peers

IN PRESENCE OF SELECTIVE EXPOSURE:
Consistently lower information integration quality

Familiarity with Source of Information

Preconceptions of Usefulness of Peer’s Information

Selective Exposure

Posts Read

EXPECTED USEFULNESS:
Related to number of posts

EXPECTED USEFULNESS:
Didn’t influence selective exposure

NUMBER OF POSTS READ:
Unrelated to the quality of information integration
Conclusions

- Confirmed most expected relationships between variables in proposed model.
- Familiarity with the source of information increased selective exposure behaviors and indicated a trend to read posts of familiar peers.
- Preconceptions of usefulness of a peer’s information shared in discussion was related to number of posts read but did not influence selective exposure behavior.
- In the presence of selective exposure, the quality of information integration was consistently lower in the final posts.
- The number of posts read was not related to the quality of subsequent information integration.
Implications

- Project provided opportunity to pilot use of:
  - Familiarity scale and instructions provided to students
  - Modified information integration scale
  - Measurement of nursing students’ selective exposure behaviors exhibited in online discussions
- Field experiment supports plans to use a larger sample to test a modified model and examination of the role of sex in this model
- Nurses need to learn to consider diverse perspectives and integrate all relevant information to arrive at effective professional decisions
- Findings are valuable to educators designing teaching/learning strategies to help students develop effective decision-making skills


