

# An Examination of the Correlation of Research Information Literacy Competence and Social-Emotional Behavior Among High School Students

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*The purpose of this research was to investigate the degree of correlation of information literacy competency and social-emotional behavior of high school students. Specifically, three assessment instruments were administered to a sample of ninth and eleventh grade students in Orange County. Respondents indicated the relative degree of their information literacy competency and social-emotional behavior. Sample research reports of those students were rated by their teachers. Correlation statistics tested hypotheses linking literacy and behavior. Persistence and “getting along” were the best predictors of information literacy and research success.*

## Introduction

K-12 library media programs are trying to establish correlations between well-implemented library service and student achievement. In terms of curriculum, school librarians tend to focus on information literacy. In attempts to measure information literacy competency, professionals are examining student research processes, and developing corresponding rubrics. School librarians are using those rubrics more specifically to assess student work, although such work is difficult to generalize and extrapolate or do on a large scale.

These assessments tend to focus on cognitive skills, with little regard to student’s social-emotional-motivational competence. The main seminal work in this area has been conducted by Carol Kuhlthau, who tracked students’ emotional status during their research process. However, little research has been conducted in the area of emotional readiness with respect to information literacy. Just as with reading readiness, there may be a developmental and psychological aspect that influences student success with regard to information literacy.

Ellis and Bernard have led the research in social-emotional behavior therapy, which examines student’s affective-motivational characteristics as contributing independently from students’ cognitive characteristics to student achievement. On a broader scale, the Collaborative to Advance Social and Emotional Learning have identified key social and emotional competencies, which include several that align with information literacy: problem identification and solving, communication skills, and social skills of cooperation and help-seeking. Thus, as students exhibit positive social-emotional behavior, they may be more likely to achieve information literacy competency.

Based on these premises, this research investigated the correlation of social-emotional behavior and information literacy competencies of sample high school students.

## Research Questions

Based on the statement of the problem, the guiding research questions were:

- 1) To what degree does a correlation exist between students' social-emotional behavior status and students' research information literacy competence?
- 2) To what degree does a correlation exist between students' social-emotional behavior status and students' research project quality?

If a significant correlation exist, then the next step in social-emotional behavior therapy may be investigated. Specifically, school librarians would focus on critical affective and behavior competencies within the information literacy framework, and provide effective interventions so students would be given opportunities to learn and practice these behaviors during the research process.

This research builds on the research that the American Association of School Librarians (AASL) is doing to insure high-quality library media programs that support the mission of ensuring that students and staff are effective users of ideas and information. It also builds on Farmer's research regarding the perceptions of school community members towards the AASL factors. The project also links to various research correlating information literacy standards and student achievement.

## **Methodology**

The strategy for answering the research questions consisted of administering three assessment instruments to 72 ninth graders and 41 eleventh graders in an Orange County high school. The ninth grade classes were designated as gifted and talented, while the eleventh grade classes were not so designated. One instrument consisted of a research process rubric adapted from Colorado's and Grover's work on information literacy competency. A parallel rubric, measuring the quality of a research product, was also adapted from these sources and the American Association of School Librarians. The instruments were used and validated by the investigator for the Tamalpais Union High School District. The research product instrument was used to analysis sample student research reports as a cross-validation of student self-assessment of research information literacy competency. A third instrument measured student social-emotional behavior: Students' Foundation for Achievement and Social-Emotional Well-Being (Bernard and Laws), which has been validated for 10 to 17 year olds.

Specifically, at the beginning of a research project, four ninth grade classes (all with Teacher A) and two eleventh grade classes (both with Teacher B) self-completed the Students' Foundation for Achievement and Social-Emotional Well-Being Student Form (Bernard, 2003) and the Research Process Rubric (Tamalpais USD, 1999). At the end of the research project, the teacher completed the Research Product Rubric (Tamalpais USD, 1999).

Bernard's questionnaire groups social-emotional factors into five attributes: confidence, persistence, organization, getting along, and emotional resilience. The Research Process rubric addresses: defining the task, developing search strategies, accessing information, comprehending information, organizing information, communicating the findings, and evaluating. The Research Product rubric measures how well students: adhere to the assignment, organize their product, justify their stances, communicate, and follow writing conventions.

The scores were coded and entered into an Excel spreadsheet. The process rubric was coded from 1 (emerging) to 4 (exceptional), and the product rubric was coded from 1 (unsatisfactory) to 6 (exceptional); these scores were treated as ordinal numbers. Grade level and gender were also coded and entered. A code number was generated for each student to link the

three instruments while insuring confidentiality. The data were then imported into SPSS version 12 (2003).

Exploratory statistics were generated to reveal potential patterns. It was suspected that gender and grade might be significant factors, so additional tests were conducted.

## Findings

### *Social-Emotional Well-Being*

Before determining the degree of correlation between social-emotional well-being and research processes or products, the investigator examined patterns within this 25-factor set of measurements. Bernard (2003) statistically analyzed the 25 factors, dividing them into five distinguishing attributes: confidence (A1), persistence (A2), organization (A3), getting along (A4), emotional resilience (A5).

Initially, an independent samples T-test was conducted to these five attributes to determine if boys and girls represented the same population, which they did. When the data for the two grades were compared, it was found that ninth graders rated themselves significantly higher/more mature than eleventh grades for persistence (7.82 vs. 7.29 with .033 significance) and organization (8.16 vs. 7.51 with .026 significance), which was entirely accounted for by the ninth grade girls' responses. Initial data analysis of the five attributes did not reveal enough differentiation, so individual factors were analyzed.

*Gender.* An independent samples T-test was conducted to determine if boys and girls represented the same population. For each gender as a whole, there was no difference in process and product. Three social-emotional factors were found to be significantly different:

- F11: I make sure I understand the teacher's instructions before beginning to work.
- F17: I listen and do not interrupt when someone else is speaking.
- F18: I am sensitive to the feelings of others and I volunteer to help others in need.

In each case, girls indicated that they exhibited these behaviors more than boys.

*Table 1*

<b>Factor</b>	<b>Girls' Mean</b>	<b>Boys' Mean</b>	<b>Significance*</b>
11	8.10	6.47	.002
17	8.23	7.65	.018
18	8.60	6.58	.000

Correlation is significant at the 0.01 level (2-tailed) or significant at the 0.05 level (2-tailed) for this and the following tables.

When the data for the two grades were treated separately, results were different. Among the eleventh graders, there was no significant difference in social-emotional well-being factors. However, the girls exhibited significantly more mature behaviors than boys along seven factors:

- F6: I continue to try, even when schoolwork is hard.
- F11: I make sure I understand the teacher's instructions before beginning to work.
- F13: I write down assignments and when they have to be completed.
- F15: I am organized in doing schoolwork.

- F18: I am sensitive to the feelings of others and I volunteer to help others in need.
- F22: I am good at controlling my temper.

Table 2

Factor	Girls' Mean	Boys' Mean	Significance
F6	8.53	7.26	.045
F11	8.50	6.94	.000
F13	8.39	5.53	.007
F15	8.37	6.76	.041
F18	8.53	7.15	.015
F22	7.68	6.76	.003

Research process behavior self-assessment and teacher-assessed research products were also analyzed using independent samples T-tests. In terms of gender, 11th grade girls outperformed boys in terms of adhering to the assignment (3.45 girls' mean vs. 3.16 boys' means with a .036 significance). Among the ninth graders, there was no significant difference in process or product.

To see if grade level made a difference in the findings about gender, independent samples T-tests were performed for boys and for girls. There was no significant difference between ninth grade boys and eleventh grade boys. Between ninth grade girls and eleventh grade girls there was no significant difference in social-emotional attributes, but in terms of products, ninth grade girls performed significantly better (correlation at the .01 level of confidence) for research product indicators. Additionally, they self-assessed their research process skills significantly higher (correlation at the .01 level of confidence) than eleventh grade girls in terms of:

- determining information need,
- developing search strategy,
- assessing and comprehending information, and
- interpreting and organizing information.

*Grade.* Seeing these results, the investigator used an independent samples T-test to determine if there was a significant difference between ninth graders and eleventh graders in terms of the measures of the three instruments.

The following individual social-emotional factor means differed significantly between the two grades:

- F1: I volunteer to participate in a new activity/experience.
- F6: I continue to try, even when schoolwork is hard.
- F7: I concentrate well when working.
- F9: I put in the effort necessary to complete difficult class and homework assignments.
- F10: I am persistent in doing schoolwork.
- F11: I make sure I understand the teacher's instructions before beginning to work.
- F17: I listen and do not interrupt when someone else is speaking.
- F19: I understand that by following important rules, I help make my world a safer and better place to live and learn.

- F20: I get along well with others.
  - F24: When I get upset about something, I am good at being able to calm down quickly.
- In each case, the ninth graders rated themselves more positively than the eleventh graders.

*Table 3*

<b>Factor</b>	<b>9<sup>th</sup> Graders' Mean</b>	<b>11<sup>th</sup> Graders' Mean</b>	<b>Significance</b>
F1	6.68	5.41	.024
F6	7.93	7.22	.023
F7	7.28	6.44	.050
F9	7.96	7.05	.002
F10	8.22	7.10	.010
F11	7.76	6.59	.004
F17	8.25	7.46	.037
F19	8.20	7.49	.000
F20	8.42	8.20	.006
F24	6.72	6.34	.018

In terms of research processes, eleventh graders self-assessed their skill significantly higher than ninth graders for:

- Process 1: Determines information need
- Process 2: Develops search strategy
- Process 5: Interprets and organizes information.

Ninth graders self-assessed their skill significantly higher than eleventh graders for Process 7: Evaluates product and process.

*Table 4*

<b>Process</b>	<b>9<sup>th</sup> Graders' Mean</b>	<b>11<sup>th</sup> Graders' Mean</b>	<b>Significance</b>
1	3.29	3.90	.011
2	3.31	4.00	.008
5	3.32	4.07	.012
7	3.31	2.95	.004

The teacher evaluated the students' work using the research product rubric. For three of the five target indicators, ninth graders outperformed eleventh graders to a significant degree:

- Indicator 1: Adherence to assignment
- Indicator 2: Organization
- Indicator 3: Proof and justification

*Table 5*

<b>Indicator</b>	<b>9<sup>th</sup> Graders' Mean</b>	<b>11<sup>th</sup> Graders' Mean</b>	<b>Significance</b>
1	4.31	3.32	.046
2	4.64	3.10	.000
3	4.78	3.05	.001

### *Well-Being and Research*

On the face of it, it appeared that older students were less mature, conducted research more effectively, and produced poorer research results. However, the differences in research product may be attributed to differences in the assignment and differences in the teachers' scoring of the product.

Thus, a follow-up Kendall Tau test was used to determine the degree of correlation between:

- social-emotional well-being and research processes,
- social-emotional well-being and research product, and
- research processes and research product.

First, the five social-emotional attributes were correlated to processes and product indicators. There was a significant positive correlation between social-emotional well-being and the research process overall:

*Table 6*

<b>Attribute</b>	<b>Correlation Coefficient</b>	<b>Significance</b>
Persistence	.141	.034
Getting along	.247	.000
Emotional Resilience	.175	.009

Among eleventh graders, the correlations were as follows:

*Table 7*

<b>Attribute</b>	<b>Correlation Coefficient</b>	<b>Significance</b>
Persistence	.290	.012
Getting along	.300	.008

In contrast, the correlation between social-emotional well-being and the research process overall (using Kendall-tau test) generated these findings for ninth graders:

*Table 8*

<b>Attribute</b>	<b>Correlation Coefficient</b>	<b>Significance</b>
Self-confidence	.256	.003
Persistence	.191	.024
Getting along	.307	.000
Emotional Resilience	.253	.003

Next, the seven research processes were analyzed separately to determine finer distinctions in the correlations. Overall findings were:

*Table 9*

	<b>Process 6: Communicate</b>	<b>Process 7: Evaluate</b>
<b>Attribute</b>	<b>Correl. Coef. / Significance</b>	<b>Correl. Coef. / Significance</b>
Self-confidence	.297 /.001	.236 /.002
Persistence	.345 /.000	.273 /.000

Organization	.013 /.890	.225 /.003
Getting Along	.389 /.000	.231 /.002
Emotional Resilience	.315 /.001	.256 /.001

Grade level seemed to be a significant variable, so a follow-up Kendall's Tau test was used to analyze the data. For ninth graders, the results were:

Table 10

	<b>Self-confidence</b>	<b>Persistence</b>	<b>Organization</b>	<b>Getting Along</b>	<b>Emotional Resilience</b>
<b>Process Indicator</b>	<b>Correl. Coef. / Signif.</b>	<b>Correl. Coef. / Signif.</b>	<b>Correl. Coef. / Signif.</b>	<b>Correl. Coef./ Signif.</b>	<b>Correl. Coef. / Signif.</b>
ID task	Not signif.	.205 /.027	NS	.206 / .026	.237 / .011
Strategize	NS	.188 / .044	NS	.215 / .021	NS
Comprehend	.330 / .000	NS	NS	.289 / .002	.217 / .019
Interpret	.268 / .004	NS	NS	.289 / .002	NS
Communicate	.203 / .031	NS	.240 / .009	.245 / .009	.236 / .012
Evaluate	.197 / .037	.244 / .010	.200 / .033	.228 / .016	.273 / .004

For eleventh graders, the results were:

Table 11

	<b>Persistence</b>	<b>Getting Along</b>	<b>Emotional Resilience</b>
<b>Process Indicator</b>	<b>Correl. Coef. / Signif.</b>	<b>Correl. Coef./ Signif.</b>	<b>Correl. Coef. / Signif.</b>
Communicate	.332/.008	.287/.023	.284/024
Evaluate	.300 / .018	NS	NS

To determine if individual social-emotional behaviors correlated with research processes, follow-up Kendall tau tests were administered. The most highly correlated behaviors were:

- 1: Confidence: I volunteer to participate in a new activity/experience.
- 6: Persistence: I continue to try, even when schoolwork is hard.
- 8: Persistence: I check my work when finished to make sure it's correct.
- 9: Persistence: I put in the effort necessary to complete difficult class and homework assignments.
- 10: Persistence: I am persistent in doing schoolwork.
- 15: Organization: I am organized in doing schoolwork.
- 16: Getting along: I am good at working cooperatively with my classmates on projects. (only for eleventh graders)
- 23: Emotional resilience: When I get upset about something, I am good at being able to calm down quickly.
- 24: Emotional resilience: I am good at bouncing back from something that happens that upsets me.

Table 12

Behavior	Overall	9 <sup>th</sup> Grade	11 <sup>th</sup> Grade	Girls	Boys
1	C6: .187/.016 C7: .273/.000		C7: .399/.002	C6: .227/.033 C7: .292/.007	C7: .245/.032
6	C6: .201/.011 C7: .209/.009		C6: .304/.021 C7: .276/.007		C6: .284/.014
8	C6: .183/.017 C7: .269/.001	C6: .197/.042 C7: .264/.007		C7: .258/.019	C7: .272/.016
9	C6: .227/.004 C7: .264/.001	C7: .249/.013	C6: .442/.001 C7: .262/.047	C7: .350/.002	C6: .345/.003
10	C6: .249/.002 C7: .239/.003		C6: .400/.002 C7: .285/.031	C7: .301/.007	C6: .316/.006
15	C6: .208/.008 C7: .273/.002	C6: .259/.009 C7: .272/.006		C7: .273/.015	C6: .233/.040 C7: .202/.023
16	C6: .270/.001		C6: .438/.001	C6: .293/.009	C6: .242/.036
23	C6: .300/.000 C7: .265/.001	C6: .226/.021 C7: .241/.014	C6: .426/.001 C7: .306/.020	C6: .352/.001 C7: .283/.010	C6: .275/.017 C7: .290/.011
24	C6: .266/.001 C7: .252/.001	C6: .271/.006 C7: .244/.013	C6: .263/.045 C7: .272/.038	C6: .221/.040	C6: .307/.007 C7: .288/.011

C6=Process 6: Communicate; C7=Process 7: Evaluate  
(Correlation Coefficient / Significance in terms of level of confidence)

Next, to determine to what degree there was a correlation between social-emotional attributes and research product, a Kendall tau test was used. The attribute average in relationship to the research product average resulted in a .228 correlation coefficient (significance at the .020 level of confidence). By separate attributes in relationship to the research product average, only persistence was significantly correlated (.312 correlation coefficient with significance at the .01 level of confidence).

When the data were examined by grades, the differences emerged. For ninth graders, there was no significant correlation between:

- overall well-being and research product average, nor
- between any one attribute and research product average.

In contrast, for eleventh graders, the findings were as follows. The attribute average in relationship to the research product average resulted in a .275 correlation coefficient (significance at the .017 level of confidence). More specifically:

Table 13

Research Product Indicator	Persistence	Getting Along	Emotional Resilience
Average	.242 / .036	.325 / .005	.247 / .033
Organization	.285 / .085	NS	NS
Proof & Justification	NS	.335 / .009	.338 / .007

(Correlation Coefficient / Significance in terms of level of confidence)



The most highly correlated research product indicator was proof /justification. Again, Kendall tau tests were used to determine to what degree correlations existed between individual social-emotional behaviors and research product indicators. It was found that examining correlations by gender and grade level was more informative than obtaining correlations for the entire population, particularly since each subgroup had unique correlations that crossed research product indicators. The most significant individual behaviors were:

*Table 14*

<b>Behavior</b>	<b>9<sup>th</sup> Graders</b>	<b>11<sup>th</sup> Graders</b>	<b>Girls</b>	<b>Boys</b>
Confident meeting new people	D1: -.226/.017 D3: -.242/.012 D4: -.249/.011			
Check work when finished to make sure it's correct		D1: .304/.020 D2: .322/.014 D3: .297/.023		D1: .292/.008 D2: .290/.008 D3: .250/.018 D4: .234/.034
Put in effort needed to complete difficult assignments		D1: .344/.011		D1: .423/.000 D2: .280/.012 D3: .352/.001 D4: .378/.001 D5: .270/.015
Work cooperatively on projects	D2: -.278/.004 D3: -.280/.004	D2: .278/.039 D3: .340/.011 D4: .274/.043		
Follow important rules for safety and have better world				D1: .231/.037 D2: .239/.031 D3: .324/.003 D4: .313/.005 D5: .310/005
Get along well with others	D1: -.245/.012 D3: -.283/.004 D4: -.271/.007	D1: .300/.026 D3: .340/.010	D2: -.275/.012 D3: -.231/.029 D4: .251/.020 D5: .236/.029	

D1: Adherence to Assignment; D2: Organization; D3: Proof & Justification; D4: Language & Strategy Use; D5: Spelling & Grammar  
(Correlation Coefficient / Significance in terms of level of confidence)

However, the most surprising findings were with regard to the degree of correlation between the research process (which was self-assessed) and research product (which was assessed by the teacher). Overall, there was no significant difference between the research process and product average. However, when individual indicators were compared, the findings were significant for most:

Table 15

Process Indicators	Adherence to Assignment	Organization	Proof & Justification	Language & Strategy Use	Spelling & Grammar
ID Task	-.257/.001	-.366/.000	-.341/.000	-.365/.000	-.361/.000
Strategize	-.333/.000	-.449/.000	-.422/.000	-.438/.000	-.411/.000
Locate	-.223/.000	-.277/.001	-.294/.000	-.273/.001	-.252/.002
Comprehend	-.352/.000	-.432/.000	-.433/.000	-.411/.000	-.408/.000
Interpret	-.308/.000	-.444/.000	-.452/.000	-.484/.000	-.462/.000
Communicate	NS	NS	NS	NS	NS
Evaluate	.190/.020	.261/.001	.272/.001	.210/.010	.251/.002

For ninth graders, there was a significant *negative* correlation between the process average and the product average: -.321 with .000 significance. More specifically:

Table 16

Process Indicators	Adherence to Assignment	Organization	Proof & Justification	Language & Strategy Use	Spelling & Grammar
ID Task	-.210/.038	-.222/.029	-.220/.032	-.267/.010	-.249/.015
Strategize	-.251/.014	-.271/.008	-.281/.006	-.306/.003	-.244/.018
Locate	NS	-.224/.031	-.288/.005	-.261/.013	MS
Comprehend	-.363/.000	-.336/.001	-.396/.000	-.355/.001	-.333/.001
Interpret	-.215/.034	-.235/.021	-.286/.005	-.373/.000	-.322/.002
Communicate	-.213/.037	-.228/.007	-.251/.016	-.281/.007	NS
Evaluate	NS	NS	NS	NS	NS

In contrast, for eleventh graders, most correlations were either not significant or were positive:

Table 17

Process Indicators	Adherence to Assignment	Organization	Proof & Justification	Language & Strategy Use	Spelling & Grammar
Communicate	.418/.003	NS	.467/.001	.337/.020	.333/.019
Evaluate	.341/.018	.559/.000	.570/.000	.506/.001	.337/.019

When gender was taken into effect, it was found that by and large, girls' scores accounted for the results, particularly for ninth grade girls (in contrast, for ninth grade boys the only significant correlation between process and product was Interpreting and Language/strategy use, which had a -.374 correlation coefficient and .016 significance).

## Discussion

This study intended to answer the following research questions:

- 1) To what degree does a correlation exist between students' social-emotional behavior status and students' research information literacy competence?
- 2) To what degree does a correlation exist between students' social-emotional behavior status and students' research project quality?

It also examined the possible correlation between students' self-perceptions of their ability to follow a research process and teachers' perception of students' research products.

It was found that gender and grade made a significant difference in terms of self-perceptions and teachers' evaluations relative to these behaviors and products.

### *Instrumental Inner-correlations*

*Social-Emotional Well-Being.* Before looking at the correlations, it was useful to examine students' self-perceptions about their social-emotional well-being. Ninth graders tended to rate their behaviors more highly, mainly for the attributes of persistence, organization, and getting along; in particular, ninth grade girls rated their behavior higher than their male peers as well as their eleventh grade female counterparts. The factors that were found to be significant followed the expected behavior styles of females: waiting to understand teachers' instructions, not interrupting, and being sensitive to others' feelings. However, by eleventh grade, boys' and girls' self-perceptions of behaviors did not differ significantly. When comparing *all* girls and *all* boys, though, girls self-reported more mature social-emotional behaviors in terms of trying hard, being organized, and self-regulating emotions. When these results are examined in light of the students' research product as assessed by teachers, it appears that the study's eleventh graders self-assessed their behaviors more accurately and realistically than did the ninth graders. Since the ninth graders were designated as gifted and talented, they may have an elevated sense of well-being. Alternatively, eleventh graders may find their studies more challenging than in freshman year and so self-assess themselves less optimistically. It would be useful to have parallel classes to test this hypothesis.

*Research Processes.* In terms of research processes, eleventh graders self-assessed their skills significantly higher for the steps of determining information need, developing a search strategy, and interpreting/organizing information. Ninth graders thought that they did a better job of evaluating product and process. Gender did not seem to be a significant factor in self-reporting of research processes, but between ninth grade and eleventh grade girls, ninth grade girls thought they were more capable in determining information needs, strategizing, comprehension, and interpretation of information. Again, ninth grade self-perceptions could have been accounted for by their gifted/talented designation, or it could be due to perceptions shaped by experience in high school courses that were more difficult and nuanced than middle school work.

*Research Product.* The ninth grade teacher assessed the students' research product significantly higher than the eleventh grader teacher relative to adherence to assignment, organization, and proof and justification. However, since the two assignments were different, it is difficult to determine the relative complexity of each aspect of the product let alone the teachers' differences in assessment. What *can* be examined, however, is the relative level of performance within each grade.

### *Social-Emotional Well-Being and Research Processes*

A significant positive correlation was found between social-emotional attributes and self-perceptions about the ability to conduct research. Overall, getting along and emotional resilience

were found to be significant at the .01 level of confidence, and persistence was found to be significant at the .05 level. The two research process indicators that correlated most closely with social-emotional well-being were communicating findings and evaluating the process / product; for the population as a whole, all attributes but organization *as a whole* were found to be significantly correlated positively at the .01 level of confidence. The subgroup that reflected the highest correlations for several of the attributes and processes was ninth grade girls. Overall, the data seem to indicate that research can be a frustrating process, so being able to deal with obstacles emotionally and intellectually, and to revise the work to a satisfactory conclusion, are important social-emotional skills across grades and gender.

*Communicating the Information.* Persistently putting in the effort to complete difficult work was a significant factor to communicating the information, particularly for eleventh grade boys. For ninth graders, being organized in doing schoolwork was also clearly correlated with communicating. For eleventh graders, working cooperatively with classmates on projects was another highly significant factor, particularly for girls. Being able to calm down quickly and bounce back when upset was significantly correlated for all subgroups.

*Evaluating Product and Process.* For eleventh graders, particularly girls, evaluating the research process and product correlated closely with risk-taking (willingness to participate in new activities and to try even when schoolwork is hard). Since girls in general are less likely to take risks, helping them develop this willingness will “pay off” in the research process. Checking work when finished to make sure it is correct appears to be more important for ninth graders. Being able to “bounce back” when upset is another significant factor, particularly for ninth graders.

Thus, teachers of ninth graders can help their students with basic study skills of organization and checking over completed schoolwork to make sure it is correct and adheres to the assignment. Teachers should also help students become more accurate in their self-evaluations by taking “reality checks” of their work habits, and reflecting on the impact of their behaviors to their final work. They can also help them with emotional skills of getting back on track when upset or frustrated. I-search research projects are a good way to incorporate this kind of emotive-metacognitive approach to learning. For eleventh graders, teachers can help them take more intellectual risks and keep trying as part of a general strategy to aim for high-quality results.

### *Social-Emotional Well-Being and Research Products*

The potential correlation between social-emotional well-being and research project is particularly interesting because it compares students’ self-assessment of their personal behaviors and the teachers’ assessment of their academic work. For this population, the most highly correlated research product indicator relative to social-emotional well-being was Proof and Justification.

For ninth grader, the behaviors that correlated negatively with research product indicators clustered around human relationships. Thus, those students who were more social tended to adhere less to the assignment, were less organized, had less substantial proof and justification, and exhibited less sophisticated language and search strategies. It could well be that they were distracted by their peers, or asked peers for advice rather than the teacher. Eleventh graders, on the other hand, leveraged their social skills to improve their research project.

For eleventh graders, persistence behaviors of checking over work correlated highly with adherence to assignments, and putting in the needed effort to complete difficult assignments

related to organization, proof and justification, and use of language and strategies. Interestingly, these behaviors were positively correlated with the evaluation step of research processes for ninth graders, but they didn't translate into significant correlations with research product indicators. Still, the finding indicates that all high school teachers would do well to reinforce behaviors of persistence, revising, and checking final work to make sure all directions are followed.

There was one social-emotional behavior that boys exhibited that correlated significantly across all research product indicators: following rules. This finding would indicate that teachers should help boys in particular see the benefits of such behavior, that it has a good "pay off."

### *Research Processes and Products*

It was anticipated that students who were competent in research processes would produce high-quality research projects. For eleventh graders, strong positive correlations exist between the research processes of communication and evaluation and research products. However, significantly *negative* correlations between research processes and products tended to apply to ninth graders. In a follow-up communication with the school library media teacher, these ninth graders tended to over-estimate their abilities. Indeed, the more highly they rated their research process expertise, the more likely that their work would be considered lower quality by their teachers. Thus, as mentioned before, teachers of ninth graders need to help them learn how to self-assess accurately by objectively linking their research behavior with their output *as they conduct research projects*. Since boys' behaviors tended to remain stable over the grades, particular attention needs to be made to ninth grade girls' self-perceptions. This finding aligns with Competency Theory as researched by Denning, et al (2003). They posited that incompetent individuals do not self assess themselves accurately, and do not improve by seeing models of competency. Part of the issue stems from not taking responsibility for one's own failings, but rather blaming others. Moreover, incompetent people do not use their peers' work to inform their own understanding. Instead, they need to be explicitly taught the skills that render them competent.

## **Conclusions**

This exploratory study examined students' social-emotional well-being, and its possible correlation with research processes and products. Because it is limited to one site, it can control to some extent school expectations, but the students studied in this investigation represent two different curricular "tracks," which limits comparisons. Additionally, having one teacher per grade also compromises the data. Still, the investigation unearthed some interesting patterns, and suggest some directions to take.

At the very least, this study shows the correlation between social-emotional well-being and information literacy: research processes and products. Basically, library media teachers and classroom teachers should pay attention to the social and emotional skills of students. Teachers need to explicitly address and teach skills of listening to assignments and checking work to make sure it adheres to the teachers' directions. Both library media teachers and classroom teachers should encourage students to persist in their research efforts; classroom teachers can emphasize the benefits of revising research questions, interpretation and manipulation of information, and communication of findings. Library media teachers can help students rethink key words, broaden their research strategies, and recycle the research process to refine questions and answers. Both

classroom and library media teachers can help students by telling them frankly that conducting research can be a frustrating experience for students as well as information professionals, and that students should try to think of different approaches when they “hit the wall” and to keep on focusing on finding satisfying solutions to research questions.

On the positive side, the American Association of School Librarians included social skills (i.e., collaborative work) in their information literacy standards. What needs to be addressed, as revealed in this study, is the need for teachers to help students differentiate between social interaction and academically-centric collaboration. While it appears that this issue is resolved by eleventh grade, teachers can recognize freshmen’s developmental behaviors and facilitate their actions to align more closely to academic demands. In addition, ninth grade teachers can help students think about how their behaviors impact their academic performance by using metacognitive exercises that concretely show the relationship between social-emotional behavior and research processes. This reality check can help students become more objective and accurate in their self-assessments. Peer review of these self-reflections can offer a socially acceptable and developmentally appropriate way to examine research efforts.

Particular attention should be made to gender-specific issues. For example, girls should be encouraged to take intellectual risks, and boys should be encourage to follow directions, both to the goal of producing more on-target and substantive work. These issues can be expressed to the entire class since the ones who need that particular encouragement can apply that information and those who already follow those ideas will be affirmed in their behavior.

This study raises several questions, which call for further research:

- How do different populations (gifted, average, at-risk) reflect different social-emotional well-being as well as research processes and products?
- Do other high schools exhibit similar behaviors and performances?
- How do other teachers assess research products; what roles can library media teachers play?
- Other theories of social-emotional well-being and self-determination should be examined (e.g., Wehmeyer) in light of research processes and products.
- What impact would interventions play, as noted above, in students’ research processing and products?

In the final analysis, conducting research is an emotional and social process as much as it is an intellectual one. Therefore, library media and classroom teachers should pay attention to these dynamics in a pro-active way so students will be more successful in each of these developmental domains.

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