

EDUCATORS' AGREEMENT WITH TECHNOLOGY TENETS OF FINANCIAL EDUCATION IN GRADES K-4

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This paper describes a study measuring the agreement of K-4 educators with hypothetical tenets for technology use in financial education. The sample was drawn from three southern school districts. Data were collected using the Financial Literacy Topic Inventory (an instrument developed for the study). The research found that respondents were neutral toward the technology items. On average, respondents agreed with technology items less than items associated with generally accepted financial education areas. The authors argue that the results relate to patterns of technology availability and use and call for further research into the employment and methods of technology-based instruction for financial education in grades K-4.

The use of instructional technology represents an important issue in educating children about their personal finances (financial education). In a digital age, how and if teachers K-4 teachers employ instructional technology for financial education models an important aspect of children's financial management.

Technology offers benefits for users' financial management. As the material gap between the affluent and impoverished expands (US Department of Commerce Census Bureau, 2002), challenges occur in technology ownership and use (National Telecommunications and Information Administration (NTIA), 2004). Financial environments experience these challenges, in part, through the patterns of technology use in the management of personal wealth and related financial applications. For example, the *Check 21 Act* (H.R. 1474, 2003) expedites availability of monies deposited into bank accounts, but expands the financial gap in two ways. First, expedited availability allows account holders with Internet access to manage their funds outside of normal business hours. This situation allows decisions that prompt increased potential long-term investment growth or savings income. Second, check-dependent account holders who rely on collection timings (or "float") risk losing potential short-term credit. By facilitating the use of technology as a tool for acquiring, managing, and developing financial resources, K-4 teachers offer their students valuable knowledge and experience to enhancing financial management.

While fostering effective technology-based instruction represents a pedagogical “bug” of itself, the financial illiteracy of teens illustrates why these skills are needed. Popular surveys (American Express Corporation, n. d.; Americans for Consumer Education and Competition (ACEC), 2001; Jump\$tart Coalition, 1997, 2006; Mandell, 2002, 2004) identify the poor understandings of income, money management, spending and credit, and savings and investment among American youth. According to the National Council on Economic Education’s *Survey of the States* (2007), only one state requires coursework in financial education for elementary grades. Author (2006) points out that this situation results, in part, from the financial education’s orphaning by the National Council of Teachers of Mathematics.

Nevertheless, personal finance represents a component of the economics discipline in social studies. In elementary grades, the study of various occupations presents a sound basis for teaching children about earnings. Spending and savings choices offer stepping stones to conversations about community interests. Money management offers an opportunity to prompt conversations about travel. Topics in personal finance lend themselves to conversations about critical issues in a capitalist society.

Employment of constructivist computer instruction processes allow opportunities for conversation about social issues related to personal finance. Maxim (2006) describes constructivism as “a child-centered approach that focuses on knowledge construction, not knowledge reproduction...students interpret new objects and events by trying to alter or modify existing mental structures that had formed as a result of their previous life experiences.” (pp. 31-33). Author (2005) describes how employment of the NTeQ model (Morrison, Lowther, & Demuelle, 1999) can stimulate conversations about relationships among human populations and corporate polluters; this model also represents a tool to foster conversations about topics in personal finance.

Nevertheless, user input represents a critical element of designing successful technological endeavors. Kvasny (2005) documented how policy-makers failed to seek user input when developing a community computer center, and this situation prompted community neglect of a technology project. Teacher input represents an important, but underutilized element of developing ideas for classroom technology instruction.

The following study was designed to interpret whether teachers and administrators for grades K-4 agree with use of technology as a financial education component with equal or more importance than the four established financial education areas (income, money management, saving and investments, spending and credit). The purpose of the research was to determine whether teachers and administrators for grades K-4 agreed that use of technology represents a financial education component with equal or more importance than the four established financial education areas (income, money management, savings and investments, spending and credit). This paper intends to begin a dialogue about the presence and nature of technology for financial education.

Literature

Technology relates to financial learning in at least two manners. First, ownership empowers users by facilitating access to previously unattainable information for financial decisions. Technology also represents a vehicle for creating and publicizing information espousing financial and societal ideas. In an environment where affluence relates to information control, technology ownership represents a vital element towards social empowerment. Within education systems, technology ownership also represents an empowering device, as administrators

control both the distribution and implementation of technology.

This literature explores the nature of technology use for learning and the connections to financial education. It begins by interpreting the effectiveness of technology in learning before reviewing use of technology in economic and financial education, and teaching children about personal finances. Finally, it considers teachers' attitudes towards technology use and relationships of environments to these attitudes.

Technology for Learning

Research generally upholds the effectiveness of using technology to facilitate learning. Cotton's (1991) review of research found computers most effective as supplements to direct instruction. While she disclosed that computers prompted higher achievement, faster learning, and stronger retention, Cotton did not support or disprove effectiveness of computer-assisted instruction within social studies or economics curricula.

Subsequent literature suggests that effective instruction occurs when using technology to prompt higher-order thinking. For example, Hannafin, Hannafin, Land, and Oliver (1997) reported that constructivist processes fostered different patterns of emphases among various learning bases. They also observed that constructionist environments allowed students to create their own patterns of content understandings. Reeves' (1998) review of literature found that using computer tools such as spreadsheets, databases and communications could be used to prompt higher-level thinking. Effective technology use facilitates students' construction of content meanings.

Technology in Economic and Financial Education

As the emphasis in financial education involves middle school and high school (National Council on Economic Education, 2005), most of the literature concerning technology use with involves older children and young adults. The literature reviewed in this section reflects this pattern. Research concerning attitudes about technology in economic or financial education appears to be sparse. Hurd (1990) observed that increased computer use in British economics learning occurred over five years in the presence of the following conditions: college or professionally based teacher knowledge, computer lab access, and active learning environments.

At least one study indicates that constructivist processes have their allure in college settings. Stiff, McCollum, and Johnson (1992) compared student performance and attitudes in two sections of an undergraduate Mathematics of Finance course and concluded that constructivist approaches benefited mathematics instruction. Constructivist-based technology instruction apparently benefits business and economics learning environments

More recently, Greco and O'Connor (2000) reported on a higher-education institution's efforts to implement such software to increase students' use of technology to facilitate their computations, thus allowing focus on their conceptual understandings. Approximately three fourths of the students successfully demonstrated mastery of material on the first of four allowable attempts, with only a little more than 1% unable to do so after the maximum permitted efforts. A subsequent random survey of one ninth of the students indicated more than four fifths agreed that the software improved their comprehension of course content. Greco and O'Connor reported no analysis for statistical significance, yet provided evidence for benefits of computer-assisted instruction in college finance.

Technology potentially benefits the students' economic learning; however, in Stiff, et al. (1992), and Greco and O'Connor (2000) technology facilitated calculations that allowed students

more time to work with economic concepts. Considering the findings of literature about general technology-based instruction, financial educators should consider the benefits of constructivist processes in personal finance instructional technology use. Students develop and explore new theories of economic patterns through student-centered constructivist processes.

The preceding assertion challenges the thought patterns of most finance students. Chan and Shum (2003) determined that college-level finance students generally do not respond favorably to creative learning processes. By college, students' academic discipline arguably connects with their patterns of instructional and behavioral preferences. Effectively, young adults organize by specialized fields of study based on their thought processes and learn to differentiate each other based on their academic fields, or psychological processes in college. If such unresponsiveness results from "instructional conditioning" of K-12 settings, it is important to consider the patterns of instructional technology use in these contexts.

Children, Technology, and Economics Education

While Peracchio (1992) identifies technology as a valuable consumer education tool, technology potentially encourages poor financial habits as well. For example, Molnar (1995) observes that implementation of the Channel One programming prompted advertisements' academic presence, facilitating corporate influences on students' spending behaviors. Just as repetition offers positive educational effects, recurring pitches for brand loyalty and glamour products engender detrimental consumer impulses.

The lasting effect of these environments remains debatable; however, Monke (1998) argued that technology exposure reduces children's real life experiences. Because of increasing contact with television and other forms of electronic media, students lack the depth of real life experiences that serve as catalysts for constructivist technology learning. Financial educators could counter these challenges by planning field trips, guest speakers, and other experiences to provide children the understanding to stimulate the creativity for substantial learning. Employing computers as classroom tutors only exasperates children's limited content.

Technology also represents a vehicle to foster student awareness of costs associated with financial decisions. Barnhardt (1999) advocates using Internet content for discussing potential effects of technological change and of recycling issues. This idea parallels Morrison, et al.'s (1999) NTEQ instructional model, espousing students' research and discovery of academic content. By encouraging constructivist classroom environments, financial educators may prompt student to discover the consequences of their financial decisions. Technology offers opportunities to stimulate children's accountability for economic behaviors.

Environmental Factors and Teachers' Technology Use

Teachers' dispositions towards technology affect their patterns of computer use. Literature indicates that computer users may progress through a series of stages as they become more familiar with technology. For example, Evans-Andris (1995) describes three styles of computer use: avoidance, integration, and specialization. Absent appropriate knowledge and training, it would appear that teachers lack the style of computer use necessary for prompting technology-based constructivist learning. These styles parallel Taylor's (1980) three roles of the computer, as tutor, as tool, and as tutee. To employ the computer in these three roles, the user should possess increasing degrees of sophistication in hardware and software knowledge. For example, one would expect a teacher who employs an avoidance style to employ the computer as a tutor. In this role, the computer requires little user knowledge, except for simple keystrokes

and/or mouse-clicks to initiate tutoring software. This combination of low skills and information dependency offers students limited content and prompts lower level thinking. Teachers who are able to integrate and customize instructional technology can utilize a variety of software and develop lessons that facilitate students' discovery of information and/or creation of new ideas.

Becker and Riel (2000) found that increases in teachers' exposure to professional activities increased the likelihood of their possessing and implementing constructivist philosophies in the classroom. Lokken, Cheek and Hastings (2003) found that high school family and consumer science teachers experienced positive attitudes towards technology after a technology related two-week summer workshop on six family and consumer science courses. However, their instrument measured only participants' comfort with technology skills and not pedagogical use. Less than one-fifth of teachers participating in Missouri's eMINTs program employed technology instruction using "student-centered, inquiry-based, technology-rich lessons" (Author, 2003, p.17). Most of the teachers who received the training did not implement the provided constructivist learning processes that used technology.

Unfortunately, school districts or colleges do not provide teachers with sufficient professional technology training (Ferenga & Joyce, 2001). Cuban (2002) describes three reasons that schools remain pedagogically short-circuited with regard to their technology implementation: slow acceptance of technology use, unaccommodating teaching contexts, and limited autonomy. Author (in press) explains that technology challenges represent a manifestation of traditional pedagogical patterns that conflict with students' social and cultural patterns. While teachers receive technology training, the nature of the training and conditions for the implementation content appear fit administrative needs, rather than student learning.

While it may be argued that school systems are inundated with modern instructional technology (National Council of Educational Statistics [NCES] 1998; Smerdon & Cronen, 2000), teachers are slow to employ this technology within traditional instruction processes because they either lack the knowledge and/or time to create/plan authentic constructivist learning for their classrooms. Cuban (2002) provides examples of how teachers have been historically slow to implement certain technology strategies. He also describes how patterns of teachers' technology acceptance relate to their methods of instructional employment. Providing schools with technology does not represent a self-sufficient educational goal. Teachers must possess the skills to use technology to fit their instruction needs, rather than in response to administrative concerns.

The purpose of this study was to compare grades K-4 teachers' and administrators' agreement with a technology component to financial education with the four established areas (income, money management, spending and credit, savings and investments) in an elementary (K-4) education curriculum. The literature indicates that teachers' technology acceptance relates to patterns of familiarity and use; however, conditions for training and implementation may shape professional attitudes.

Methodology

The study involved teachers and administrators from three school districts in the southern United States. One was an urban school system with approximately 4,640 elementary school teachers (National Council for Educational Statistics, 2002). The other two systems were located in rural counties bordering the urban school system. They employed approximately 160 and 375 elementary school teachers each.

Sample

The 2004 data collection process involved five elementary schools from the urban school system and two elementary schools from each of the other two systems. The primary author selected four elementary schools from the city school system and two elementary schools from each of the other two districts. By assigning the schools numbers and selecting the numbers through a blind process, a random process was employed to select schools. Because of the low response rate from one of the urban system's schools, additional data were collected from another school, selected through the same random process.

The sample consisted of 167 rural and 93 urban educators (total of 260), of which most (213) were teachers. The sample's ethnic composition involved 174 Whites, 63 African Americans, 12 members with other ethnic categories, and 11 of undisclosed ethnicities. There were 24 males, 228 females and eight respondents of undisclosed gender. Ninety percent of respondents' incomes ranged from \$20,000 to \$99,999. One percent had incomes less than \$20,000 and nine percent had incomes of over \$100,000.

Instrument

The primary author developed the Financial Literacy Topic Inventory (FLTI), which contained 34 potential financial education curriculum tenets for grades K-4. Each item involved a 5-level Likert style response, ranging from Strongly Disagree (1) to Strongly Agree (5). Of the 34 original items, 21 represent the four areas of financial literacy established by the Jump\$tart Coalition. The items for Income, Money Management, Spending and Credit were taken verbatim from the Jump\$tart Coalition's revised financial curriculum benchmarks for the end of Grade 4 (Jump\$tart Coalition, 2001). The other 13 items represented two other areas (Character and Technology).

The technology items described employment of different software and computer applications in various aspects of financial comprehension and information gathering (e.g., Item 6, Computer spreadsheets such as Lotus and Excel may be used to keep track of money we get and use, and Item 26, E-mail may be used to tell companies what we like or dislike about their products.) The lead author submitted seven proposed items to three elementary education experts in a southern urban setting. All of the experts responded. One of the experts was a former elementary school teacher, now a professor at an southern urban university. Two were technology coordinators at local public elementary schools. Items were eliminated because they were redundant or were too complex for children in fourth grade. Two additional items were recommended for inclusion on the instrument. One, concerning the registration of warranty information, was added. The other, involving Internet use for acquisition and sale of collectables was excluded. Although the primary author considered collectables as forms of investment, he did not believe their conceptualization as developmentally appropriate for students completing fourth grade.

Pilot Surveys

The pilot study occurred during the fall of 2003 and assessed the reliability of the instrument and its subscales. The four selected schools contained a possible 93 respondents for each survey. The two pilot survey administrations provided 95 responses; 44 respondents (47.31%) for the first administration and 51 (54.83%) for the second. Table 1 provides the results of the pilot administrations, considering only those surveys where respondents completed all survey items.

Table 1
Financial Literacy Topic Inventory
Pilot Reliability Coefficients (α)

	Administration 1 (<i>N</i> = 24)	Administration 2 (<i>N</i> = 32)
Income*	.64	.58
Money Management*	.52	.73
Savings and Investments*	.75	.72
Spending and Credit*	.75	.69
Technology	.76	.88

*Adjusted for one inconsistent item

Administration of Instrument.

The instrument was administered in twelve educational settings from January through April of 2004. During this period, 363 surveys were distributed, with 260 returned for a response rate of 71.60%. Table 2 provides the reliabilities associated with the full administration. Of the 260 surveys, only 194 contained responses to all survey items

Table 2
Financial Literacy Topic Inventory
Revised Reliability Coefficients (α)

	Full Administration (<i>N</i> = 194)
Income	.65
Money Management*	.73
Savings and Investments	.75
Spending and Credit*	.56
Character	.68
Technology	.75

* Highest alpha removing one item from the scale

Findings

Data analysis occurred through three processes: descriptive statistics analysis, agreement rate patterns, and specific item responses. Because of the aforementioned subscale inter-reliability statistics, the primary author considered only three (income, money management, and savings and investment) of the established financial education areas.

Descriptive Statistics

The descriptive statistics are associated with interpretations of technology and the three aforementioned components of financial education. Table 3 presents the statistics associated with this analysis.

Table 3
Descriptive Statistics
Technology and the Three Measured Financial Education Areas (N = 194)

	<i>M</i>	<i>SD</i>	Skewness
Technology	3.71	0.65	-0.39
Income	4.11	0.48	-0.07
Money Management	4.26	0.58	-0.56
Savings and Investment	4.15	0.49	-0.51

Where provided, comments from respondents indicated that financial learning represented an important pursuit; but instructional technology use represented a secondary consideration to academic basics, such as reading. For example, a respondent commented “Many of our students have little or no access to computers. However, financial knowledge information and training remains a critical need.” Technology cannot be a priority if not prominent in the community or its schools. Similarly, other comments, “Our computers are old and have few users. I would do more if I had the equipment”, “Computers are good tools, but teaching my kids how to read is a much higher priority. There are not enough hours in the day to take my children through my one computer”, and “The extent of computer classroom use for students would increase if appropriate computer facilities increased”, point to challenges seeing the importance of technology use when the schools or districts lacked the appropriate resources. Finally, a comment from a teacher having “Only one computer in my room, which may be used for writing IEP’s ” indicated a lack of autonomy for computer use. Where present, computers are assigned district or school preference for technology use in administrative capacities, such as records storage or administrative communication, rather than as learning tools.

Agreement

The next interpretation compared technology agreement rates with the three measured financial education components. Table 4 presents associated statistics.

Table 4
Agreement Rates
Technology and Three Measured Areas of Financial Education (N = 194)

	Strongly Agree or Agree	Neutral	Disagree or Strongly Disagree
Technology	69.60	25.80	4.60
Income	92.80	6.70	0.50
Money Management	89.70	9.80	0.50
Savings and Investment	90.70	9.30	0.00

Interpretation of Agreement Rates

The statistics present an additional dimension to those in Table 3. The larger neutrality of agreement with technology items may be attributed to unfamiliarity with either the nature of the technology tools or their use.

The final analysis compared the descriptive statistics and agreement rates associated with survey’s technology items. Table 5 presents the associated statistics.

Table 5
Technology Items
Agreement Indicators for Each Item (N = 194)

	μ	<i>SD</i>	Skewness
Item 6. Computer spreadsheets such as Lotus and Excel may be used to keep track of money we get and use.	3.34	1.04	-0.09
Item 24 Through the Internet, we may use computers to purchase items and check credit card, bank, and investment accounts.	3.77	0.86	-0.81
Item 26 E-mail may be used to tell companies what we like or dislike about their products.	3.85	0.91	-0.86
Item 28 Through the Internet, we register warranty information on products purchased.	3.73	0.91	-0.53
Item 30: Businesses use programs like Power Point or I-movie to make advertisements and commercials.	3.58	0.95	-0.22
Item 34. Through the Internet, we may find information about products we buy, to ensure they're not harmful.	3.99	0.79	-0.69

Interpretations of Technology Items.

The statistics presented in Table 5 indicate, on average, that respondents possessed moderate to high neutrality with the items presented for each technology component item. Two of the items prompted statistics approaching skewed response distributions, indicating that respondents agreed or strongly agreed (more than disagreed or strongly disagreed) with these items. Items concerning commonly used tools, such as the Internet and email, prompted the highest means. Those concerning spreadsheet and presentation media prompted the lowest means.

Discussion

The respondents' mean agreement with technology items was less than the mean agreements of the three measured financial education components. This section explores the reasons for this finding. The discussion relates findings to education theory, to the sample characteristics, contextual relevancy, and then to technology familiarity.

General

Literature advocates constructivist models of computer-based instruction (Clark & Gorski, 2002; Hannafin, et al., 1997; Hay & Barab, 2001; Morrison, et al., 1999; Reeves, 1998). Teachers need supportive administrative and curricular environments to facilitate such process (Hackbarth, 2002; McDonald & Ingvarson, 1997). Unfortunately, teachers and policy-makers possess different priorities (Monke, 1998) that they must reconcile to fulfill instructional technology goals. This study finds that similar challenges affect technology use for financial education.

Sample Composition

Still, the context of the respondents represents an important consideration. Of the 194 respondents fully completed surveys, 128 (65.97%) identified themselves as being in rural settings. The digital divide represents a particularly challenging issue for rural communities

because these communities experience less access to technology than urban settings (US National Commission on Libraries and Information Science, 1999; Wiburg, 2003). Presuming rural inexperience and discomfort with technology tools, the abundance of rural educators participating in this study may have influenced lower agreements with technology items.

Developmental Appropriateness

It is possible that respondents considered the items as developmentally inappropriate for students in their classrooms. Although technology experts reviewed the items, the sample included educators having contacts with large numbers of children possessing various degrees of computer skill. Consistently with the writings of Evans-Andris (1995), the degree to which respondents agreed with technology items could have related to their interpretation students' technology skills, their patterns of instructional preference, and their perceptions of curricular consistency.

Administrative Priorities

Commenting respondents indicated that they possessed limited technology resources and employed them for administrative purposes. Cuban (2002) describes the administrative technology demands placed on classrooms, documenting how teachers mostly employ their computers for administrative processes, rather than student engagement. Patterns of administrative instructional technology control occur through the decisions about training opportunities and learning environments.

Technology

Respondents' expressed the most agreement with items concerning Internet use and Email, but their least agreement with the item concerning spreadsheet and other software applications. These patterns indicate that partiality may relate to training, experience and comfort with different software. It is possible that respondents did not experience these technology programs, lacked training for methods to use these programs, or were confused by items' syntax.

Nevertheless, lower agreement with Item 30 (Businesses use programs like Power Point or I-movie to make advertisements and commercials) also points to differentiation between businesses in-house and contracted marketing efforts. Research (McKenzie, 1971; McKinney, McKinney, Larkins Gilmore, & Ford, 1990) indicates that preservice and practicing elementary school teachers do not have the knowledge of economics to consider such professional patterns, thus this distinction is unlikely.

Conclusion and Recommendations

Respondents to this survey expressed neutrality towards items concerning technology use in financial education for grades K-4; their mean agreement was less than their agreement with generally accepted areas. Although these results support development of technology instruction within financial education, further studies should explore how the training of teachers in constructivist processes relates to the nature and conditions for such instruction tenets.

These findings are based on an instrument with only six technology items and a sample bias toward rural educators. Future studies must provide deeper interpretations of technology use in financial education by sampling other populations to fully comprehend attitudes toward this curriculum and instruction issue.

The financial education community should clarify the tenets for a technology use

component within financial education curricula. The study found educators valued a proposed technology financial education component. The largely rural sample may have prompted the moderate agreement with items. Future studies should examine patterns of technology use in financial education and influences of learning contexts.

Nevertheless, teachers need the professional development, time, and resources to develop the environments to affect this learning. Computers and other communication bases represent information tools that potentially empower users with social and information resources; however, unequal technology distribution, inadequate working conditions, and technology use limitations impair classroom teachers' effective computer-based instruction. Teachers need the training, access, and freedom to discover and utilize technology resources in their optimal manners. However, these processes require the conditions to develop and implement effective constructivist learning environments. Literature shows that this situation exists in general education. The results of this study indicate that financial education contexts are not different.

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