Predictions for the Future of American Public Education

Voices from Classrooms and Communities

LYNNA J. AUSBURN, ANDREA M. ELLIS, & EARLENE WASHBURN
Oklahoma State University

Abstract

This study used descriptive statistics, rating and ranking procedures, and factor analysis to describe the predictions of 447 educators and members of the general public about 13 concepts that would influence the future of American public education. The 13 items formed four broad factors that were predicted to influence the future of education in the following order: (1) general educational requirements, (2) serving learning needs, (3) meeting ethical responsibilities, and (4) maintaining fiscal accountability and competitiveness. All individual items and factors were perceived to be moderately to strongly influential on the future of educational practice. Predictions of the influence of the factors were similar across demographic groups and between educators and the public. The study created a picture of 21st-century education as an effort to find fiscal resources to maintain relevant emerging technologies and to make them effectively and universally available to all learners in ways that address their individual needs.

> It may be hard for an egg to turn into a bird: it would be a jolly sight harder for it to learn to fly while remaining an egg. We are like eggs at present. And you cannot go on indefinitely being just an ordinary, decent egg. We must be hatched or go bad.
>
> —C. S. Lewis, British fantasy writer

> The world hates change, yet it is the only thing that has brought progress.
> —Charles Kettering, American inventor
> and head, General Motors research

> The best way to predict the future is to invent it.
> —Alan Kay, American computer scientist

Today the world changes like the images in a kaleidoscope while we watch in fascination and amazement. For several years, education—like the society it serves—has stood on the strategic edge of change that is massive, increasing, and relentless (Ausburn, 2003), and the pace continues to accelerate. Leaders in business and technology have described contemporary change in terms of *disruptive technologies* that fundamentally and irrevocably alter human society and *inflection points* at which consumer usage and expectations alter so massively that change is mandatory for survival (Gates, 1999; Grove, 2002).

Disruptive technologies are currently driving multiple concurrent revolutions in areas such as social networking; e-collaboration and informal social learning; virtual environments; multi-purpose communication devices; globalization; Internet economics and e-commerce; mass customization; anywhere/anytime learning; and nontraditional forms of education. These revolutions are making the world a shape-shifting landscape (Ausburn, 2003; Ausburn & Ausburn, 2010; Ausburn, Ausburn, & Kroutter, 2010; Ausburn, Martens, Dotterer, & Calhoun, 2009; Berg, 2005; Canton, 1999, 2006; Cross, 2007; Friedman, 2007; Kennard, 2010; Pine, 1993; Tapscott, 1998; Tapscott & Williams, 2007). Changes are fueled by new "free agent" learners who learn best collaboratively in a 24/7 environment using digital resources outside traditional school structures (Project Tomorrow, 2010) and expect learning personalization, diversity, and equity of access (Darling-Hammond, 2010; Marx, 2006). Increasing availability of Internet-based digital content and open/free resources are also forcing new business models for education. These new models push education to "compete with free" as students and teachers bypass expensive textbooks and turn to more flexible and less costly sources of course content (Fletcher, 2010). In this new landscape, there is a widespread demand for living and learning with the magic of "dancing electrons" (Wright & Yates, 1999) in a world where digital technology is all about living and is taken as much for granted as air by the digital natives who cannot remember when it did not exist (Negroponte, 1995; Prensky, 2001; Tapscott, 1998).

Ausburn (2003) pointed out that whether we like it or not, this new reality "simply *is*, and neither denial nor disapproval will change it or help us cope with it" (p. 80). She presented five trends from the literature that she asserted were making their presence felt in education and pressing on its future: (1) rise

and dominance of the Internet, (2) continuous advances in computer power, (3) increasing customization of learning, (4) increasing emphasis on return-on-investment (ROI) in education and training, and (5) convergence of trends 1–4 in a highly flexible "a-al-carte" learning model that supports individualization, customization, and markets of one.

Ausburn (2003) also reported a series of Delphi studies with panels of experienced educators that measured their predictions for the future of public education and compared them to the trends that were emerging in the literature. Her findings indicated that the educators who participated in her studies made predictions for education that aligned well with the emerging literature. They foresaw a future in which education: (a) operates competitively on a business model based on customer service, views students as customers, and makes decisions based on ROI; (b) uses curriculum that is modular, flexible, and highly individualized; (c) relies on increasingly powerful digital technologies; (d) offers a wide variety of learning time/place/method options; (e) stresses performance evaluations of teachers and pay-for-performance; and (f) thinks globally to work effectively with larger, more diverse, and more geographically scattered learner populations.

If the educational scenarios identified by Ausburn (2003) are accurate, then, applying C.S. Lewis's change analogy, the egg of American public education is being pressured by powerful technological and resultant sociological forces, and is beginning to crack. Viewing this as a positive thing, the bird of new education for a new age may be about to be released to find its wings. However uncomfortable this new freedom may be, it is necessary to set free the creativity and flexibility required to bring schools and educators fully into a new century and give them opportunity to invent a viable future—a future perhaps influenced by Egan's (2008) "Imaginative Education" that engages learners in curricula that are vivid, lively, and personal rather than textbook-bound and dull.

Before public education can invent its future, it must first recognize the forces that may affect it. However, despite much discussion of individual new technologies and their effects on education, little has been reported in the literature since Ausburn's predictive studies to assess and describe the forces that educators feel are shaping their future. To guide collaborative discourse and action for sensing and shaping the future, education leaders need to hear the perceptions of practitioners and clients and their views on what may influence educational practice in a century of rapid and radical changes. The necessity to hear these voices provided the impetus for this study.

Purpose and Research Questions

The purpose of this study was to describe current predictions from classrooms and communities about influences that will shape American public education

in the 21st century. It was felt that these perceptions might inform debates on policies and initiatives that could guide public education to successful innovation and continued viability as the new century progresses.

The following research questions guided the study:

1. What influences do educators and the general public predict will have the strongest effects on the future of American public education?
2. How do the individual influences cluster into identifiable factors?
3. What factors are predicted to be most influential in educational practice?
4. Are predicted factor influences perceived differently by males and females, by younger and older individuals, and by those inside and outside of education?

Theoretical and Conceptual Framework

The theoretical underpinning for this study comes from Otto Scharmer's emerging Theory U. Scharmer (2009) has described his Theory U as a way of stepping into the emerging future and leading from the future as it emerges. Theory U is functional on two levels. At the theoretical level, U focuses on *how one attends* and asserts that the way in which we attend to a situation determines how that situation unfolds. At an operational level, Theory U is also a social technology, at the heart of which is what Scharmer calls *presencing.* Derived from the words "presence" and "sensing," presencing refers to learning to sense the future that is trying to emerge and learning from the future as it emerges. This produces leaders who can help others to create collectively to bring forth a desired future from the one that wants to emerge.

This study is conceptualized as an application of Theory U and its social technology. It describes current predictions and the educational future these predictions may be pushing toward emergence. It offers to educational leaders some data for "presencing" so they can perhaps sense an emerging future and lead collective efforts to shape it.

Methodology

Research Design

This study used a descriptive quantitative research design and survey methodology. All data were collected via a written questionnaire administered personally to participants by members of a trained research team at Oklahoma State University. To ensure uniformity of the data collection process, a written protocol was used by all members of the research team. Quantitative data from the questionnaires were coded and entered into the SPSS statistical program for analysis.

Sample

The study had a total of 447 adult participants drawn from both education and the general population in the state of Oklahoma. The research team personally selected participants purposefully to include a variety of individuals based on the demographic variables of gender, age (ranging from 18 to more than 60), ethnicity, and educational attainment. The sample included participants from inside and outside of the education profession. Among the educators in the sample, all levels of education were included. Also represented in the sample were both urban and rural communities. The demographic profile of the sample is shown in Table 1. While the population parameters in Oklahoma for all these variables was not available for verification, the sample was purposefully selected to be broadly inclusive of all appropriate demographic groups.

Instrumentation

Data for the study were gathered via a researcher-developed questionnaire. The questionnaire contained three sections. Section 1 comprised six questions to collect demographic information. Section 2 presented participants with 13 items (see Table 2) that could influence the future of American public education. These items were drawn from previous predictive studies by Ausburn (2003) and appropriate literature on education and social futures (e.g., Berg, 2005; Canton, 1999, 2006; Cross, 2007; Darling-Hammond, 2010; Egan, 2008; Friedman, 2007; Marx, 2006; Phillips & Phillips, 2007; Pine, 1993; Tapscott, 1998; Tapscott & Williams, 2007). The 13 items were validated and refined for relevance and coverage through small focus groups. On the questionnaire, participants were asked to rate the 13 items on how influential they would be in determining the future of American public education on the following 5-point Likert-type scale: 1 = no influence; 2 = minor influence; 3 = moderate influence; 4 = major influence; 5 = extreme influence. They were then asked to select the six items they felt would be most critical for education to address in order to have a successful future and to place their choices in rank order, with 1 being the highest rank (most influential). Section 3 of the questionnaire posed three open-ended questions asking participants to identify their greatest concerns about the future of education and society, along with their single strongest recommendation to public education to help make it successful in the future. Data from only the first two quantitative sections of the questionnaire are reported in this paper.

Procedures and Data Analysis

All data were collected by a research team using a standardized written protocol to facilitate uniformity of collection procedures. The team members purposively selected their own participants following guidelines to ensure appropriate sampling on the demographics chosen for the study. After granting informed content, participants met individually with a member of the research team to complete the questionnaire according to the prescribed protocol. Quantitative data were

Table 1. Sample Descriptive Demographics (N = 447)

Demographic Variable	*N*	*% of Variable*	*% of Sample*
Gender			
Male	166	NA	37.1
Female	281	NA	62.9
Age Group			
18–30	180	NA	40.3
31–45	120	NA	26.8
46–60	125	NA	28.0
>60	18	NA	4.0
No Response	4	NA	.9
Highest Educational Attainment			
Did not complete High School	1	NA	.2
Completed High School	59	NA	13.2
Completed vocational program	11	NA	2.5
Attended college but no degree	79	NA	17.7
Completed 2-year Associates degree	37	NA	8.3
Completed 4-year Bachelors degree	130	NA	29.1
Completed graduate degree	128	NA	28.6
Ethnicity			
Caucasian/White	347	NA	77.6
African American	33	NA	7.4
Native American	21	NA	4.7
Asian	12	NA	2.7
Hispanic/Latino	13	NA	2.9
Multiracial	16	NA	3.6
Other	4	NA	.9
No Response	1	NA	.2
Work in Education (Teacher, Administrator, Counselor, etc.)			
No	258	NA	57.5
Yes	189	NA	42.3
Education Sector Where Work			
Not in Education	258	NA	57.5
Primary Education	28	14.8	6.3
Secondary Education	71	37.6	15.9
Vocational/Career Education	25	13.2	5.6
Higher Education	65	34.4	14.5

entered into the SPSS program for statistical analysis with descriptive statistics, ranking point tabulation, factor analysis, and *t*-tests.

For the rating data on the 13 influence items, descriptive statistics (i.e., minimum, maximum, and mean ratings) were calculated. For the ranking data, a sigma rank points (∑RankPoint) procedure was used. First, points were given to the assigned ranking of each of the 13 items by each participant as follows: rank1 = 6 points; rank2 = 5 points; rank3 = 4 points; rank4 = 3 points; rank5 = 2 points; rank6 = 1 point; item not chosen in top six = 0 points. Then, the points obtained by each of the 13 items were summed to obtain a *sum of ranking points*, or ∑RankPoint score.

To analyze the clustering of individual influence items into groups, a factor analysis was conducted. Finally, to examine possible differences between demographic groups on the predicted educational influences of the factors, mean factor scores derived from the factor analysis and independent sample *t*-tests on the factor scores were used.

Findings

Strongest Predicted Individual Influences on the Future of Public Education

This issue was addressed with descriptive analyses of how the participants chose to rate and rank the 13 individual influences included in the study. Both the rating and ranking data from the research questionnaire were used to examine the participants' absolute and relative predicted strengths of the 13 items.

The participants' predictions of the *absolute* strengths of the 13 influences on the future of public education were assessed with the descriptive statistics of maximum, minimum, and mean rating assigned to each item on the 5-point Likert-type scale. These data were interpreted as absolute measures of the predicted influence of each item because they required no comparison among the items. By contrast, the *relative* predicted strengths of the 13 influences were assessed with the ∑RankPoint scores, which were interpreted as relative measures of the perceived influence of each item because they required comparisons of the influence strengths among the items. The rating and ranking data for each of the 13 items are shown in Table 2.

Higher mean ratings and ∑RankPoint scores were interpreted as indicating stronger predicted influence on the future of education. Table 2 shows that rank orderings of the 13 items were in general agreement based on mean ratings and ∑RankPoint scores, with only minor variations observed between these two measures. Given the small frequency and magnitude of these variations and because the ranking scores were based on forced comparisons of items, the ∑RankPoints were considered the primary indicators of the relative perceived influence strengths of the 13 items and were used to assign the overall item rankings shown in Table 2.

Table 2. Rating and Ranking Points Descriptive Statistics for 13 Influences on the Future of Public Education

INFLUENCE	*Minimum Rating*	*Maximum Rating*	*Mean Rating*	*SD*	*∑Rank Points*	*Over-all Rank*
Keeping up with current technology	1	5	4.40	.706	1412	1
Meeting individual learner needs	1	5	4.12	.926	1099	2
Gaining adequate funding	1	5	4.36	.815	1074	3
Promoting technology literacy and skills	1	5	4.22	.782	993	4
Making technology available to everyone	1	5	4.15	.882	875	5
Providing access to education anytime, anywhere	1	5	3.83	.922	750	6
Providing for on-job-training, continuing education, and life-long learning	1	5	4.09	.910	683	7
Serving a culturally diverse population	1	5	4.03	.962	664	8
Promoting understanding of ethical considerations related to technology, social, and global issues	1	5	3.79	.983	446	9
Being service oriented	1	5	3.64	.984	377	10
Meeting new federal, state, and local mandates	1	5	3.72	1.00	360	11
Demonstrating positive return-in-investment for money spent	1	5	3.68	.985	333	12
Competing with new non-traditional types of education providers (online universities, alternative schools, home schooling, charter schools, etc.)	1	5	3.48	.976	232	13

The magnitudes of the ∑RankPoint scores and the distances between them give clear indications of the predictions of the study's participants about what influences would be strongest on the future of public education. Based on the ranking point scores they gave the 13 items, the participants felt strongly that *efforts to keep up with current technology* would have the greatest influence on education's future, followed by *meeting individual learner needs* and *gaining adequate funding.* This top tier of predicted influences was followed by *promoting technology literacy and skills.* The top six influences were rounded out by *efforts to make technology available to everyone* and *providing access to education anytime and anywhere*. The remaining seven items were predicted to have comparatively lesser influence on education's development, although the mean rating scores indicated that all 13 items were viewed as at least moderately influential in shaping education's future. Included in the items perceived as relatively less influential were several things generally considered important to educators: *serving a culturally diverse population; promoting understanding of ethical issues*; and *meeting government mandates.* The relatively low positioning of the need to serve a culturally diverse population may be related to the ethnic composition of the sample, which was more than 75 percent Caucasian. Competing with non-traditional types of education received the lowest predicted strength of influence, suggesting that—correctly or incorrectly—these educational alternatives are not currently viewed as primary threats to public education's future viability.

Clustering of Individual Influences into Identifiable Factors

Examination of how the 13 individual influences clustered into groups of related items was performed by a factor analysis. Inputs for the factor analysis were the rating scores of the study participants of the predicted influence strengths of the 13 items. Cronbach's coefficient alpha for the 13 items was .83, which, according to criteria ($a = \geq .70$) established by Nunnally (1978), indicates acceptable internal consistency reliability. At the first stage of the factor analysis, the initial eigenvalues, variances accounted for, and scree plot suggested that a two-factor (43.6% of variance explained) or a three-factor (52.2% of variance) solution might be effective in explaining the underlying structure of the 13 influences. However, neither solution created a factor matrix that met the criterion Kachigan (1991) called "comprehensibility" (p. 247) and Green and Salkind (2005) referred to as "interpretability" (p. 321). So, following Kachigan's recommended approach to selecting the number of factors to extract and rotate, several factor solutions were inspected. This inspection showed that a four-factor solution was comprehensible and met Sheskin's (2007) requirement of balancing "parsimony" and "comprehensiveness" in accounting for as much variance as possible in as few factors as possible (p. 1623). The four-factor solution accounted for a respectable 59.01% of the total variance among the 13 influence variables. While

Stevens (1996) suggested that some researchers attempt to get a minimum of 70% of variability in factor solutions, other multivariate specialists (e.g., Kachigan, 1991; Sheskin, 2007) point out there is no set rule for how much variance is acceptable. Given the interpretability of the factors generated by the four-factor solution, the strength of the factor loadings it produced, and the magnitude of total variance it accounted for, the four-factor solution was accepted as most appropriate. The four factors were extracted with the principal components method and rotated to Varimax, which is the most common factor rotation criterion, being "designed to create the simplest factorial structure" (Sheskin, 2007, p. 1630). Statistical data for the four-factor solution including all 13 influence items are shown in Table 3.

Table 3. Rotated Factor Matrix for Four-Factor Solution of 13 Influence Items

	Factor Number and Loadings			
Influence on Future of Public Education	*1*	*2*	*3*	*4*
Keeping up with current technology	.79	<.10	<.10	<.10
Promoting technology literacy and skills	.81	<.10	.21	<.10
Making technology available to everyone	.68	.32	<.10	.22
Providing access to education anyplace, anytime	.40	.60	.17	<.10
Being service oriented	.18	.63	.17	.23
Providing for on-job training, continuing education, and life-long learning	<-.10	.71	.22	.18
Meeting individual learner needs	.12	.47	.12	.51
Gaining adequate funding	.17	.11	.59	.22
Demonstrating positive return-on-investment for money spent	<.10	.20	.79	<-.10
Competing with new non-traditional types of educational providers	<.10	.35	.61	<.10
Meeting new federal, state, and local mandates	.12	-.19	.52	.63
Serving a culturally diverse population	.11	.30	<-.10	.75
Promoting understanding of ethical considerations related to technology, society and global issues	.14	.34	.25	.61

Extraction Method: Principal Components
Rotation: Varimax with Kaiser Normalization
Total variance accounted for = 59.01%

The factor loadings for each of the 13 education influences on the four extracted factors shown in Table 3 can be interpreted as how strongly each influence correlates with the factor, or how much it contributes to the *meaning* of each factor (Kachigan, 1991). As with other correlation relationships, factor loadings can fall between 0.00 (no relationship) and 1.00 (perfect relationship), and can be either positive or negative in direction. In determining what is a "strong" or "high" factor loading for deciding which variables load onto—and contribute to—factors, Kachigan (1991) recommended that a common sense approach should be taken in examining the loadings *within* a factor and *across* the factors. While there are no generally agreed-upon loading rules for placing items on factors, in practice the lower limits are usually set between .30 and .50 (Kachigan, 1991; Sheskin, 2007). For this study, an item was considered to load on, or help to define, a factor if its factor loading was ≥ .30. This choice of cut-score for factor loadings allowed exploration of the full range of items that might help define each factor.

Using these guidelines, several findings were derived from the four-factor matrix shown in Table 3 based on the patterns of factor loadings. The four factors were assigned descriptive names based on the influence items that loaded on them at ≥ .30. Factor names assigned, along with the influence items that defined each factor were:

Factor 1*. Performing General Education Requirements:* This factor was strongly defined by loadings (≥ .50) from keeping up with current technology; promoting technology literacy and skills; and making technology available to everyone. Providing access to education anyplace/anytime also had a sizeable loading (.40) on this factor.

Factor 2*. Servicing Learning Needs:* This factor had strong loadings (≥ .47) from providing access to education anyplace/anytime; being service oriented; providing for on-job training, continuing education, and life-long learning; and meeting individual learner needs. Moderate loadings (≥ .30) came from making technology available to everyone; serving a culturally diverse population; competing with new non-traditional education providers; and promoting understanding of ethical issues.

Factor 3. *Maintaining Fiscal Accountability and Competitiveness:* Strong defining attributes of this factor (≥ .50) included gaining adequate funding; demonstrating positive return-on-investment (ROI) for money spent; competing with new non-traditional types of educational providers; and meeting new federal, state, and local mandates.

Factor 4. *Meeting Ethical Responsibilities:* This factor included strong loadings (≥ .50) for meeting individual learner needs; meeting new federal, state, and local

mandates; serving a culturally diverse population; and promoting understanding of ethical considerations related to technology, social, and global issues.

The factor analysis was based on the ratings of the participants of the predicted strength of influence on the future of education of 13 items. The statistical emergence of these four factors indicated that the participants in this study viewed the 13 influences as forming four multi-dimensional forces that would shape the future of public education. Factor loadings suggested the participants perceived that addressing issues of technology fluency and educational access (Factor 1) was a set of *basic responsibilities* that would influence the future of education. They also saw *serving learning needs* (Factor 2) as a multi-dimensional set of influences on their future. Maintaining *fiscal accountability and competitiveness* (Factor 3) they perceived as including the reciprocal issues of gaining and then effectively expending financial resources to secure the future of public education. The participants related issues ranging from obligations to individual learners to fostering awareness of social and global issues among the *ethical responsibilities* (Factor 4) that would affect education's future.

Several influences were perceived as being part of more than one factor. For example, the participants viewed open access to education as primarily a component of servicing learning needs, but also to a lesser degree as part of education's general responsibilities. Meeting the needs of individual learners was perceived as nearly equally part of servicing learning and meeting education's ethical responsibilities. Similarly, serving a cultural diversity population and promoting ethics were seen primarily as ethical responsibilities for education's future, but to a lesser degree as part of providing for learning needs. Meeting government mandates was viewed as primarily an ethical responsibility but also as an accountability issue for schools of the future. Competing with new types of educational providers was viewed primarily as a matter of accountability and competitiveness but was also seen as a part of meeting learning needs.

One negative factor loading emerged that may merit further investigation. Meeting new federal, state, and local mandates loaded negatively on Factor 2, Servicing Learning Needs. While this factor loading was only moderate in strength (-.19), the perception that meeting emerging government mandates may be inversely related to effectively addressing learning needs has political and policy implications that may warrant further research.

Factors Predicted to be Most Influential on the Future of Public Education

This was addressed through the factor analysis described above. To examine the comparative predicted influence strength of the four factors that emerged from the factor analysis, first a factor score was calculated for each of the study's participants on each of the four factors as described by Sheskin (2007).

Table 4. Sum of Factor Scores (∑FactorScores), Mean∑FactorsScores, and Rank Ordering for Four Influence Factors (N = 447)

Influence Factor Number and Name	*∑FactorScores*	*n*	*Mean ∑RankScores*	*Rank Based on Mean ∑RankScores*
1 Performing General Education Requirements	7391	445	16.61	1
2 Servicing Learning Needs	6956	444	15.67	2
4 Meeting Ethical Responsibilities	6968	445	15.66	3
3 Maintaining Fiscal Accountability and Competitiveness	6781	445	15.24	4

To calculate the factor scores, the Likert-style influence ratings assigned by each participant to the individual items that loaded on each factor were summed. For this calculation, only the items with the four highest loadings on each factor were used. All loadings included in this calculation were ≥ .40. Thus, only primary or strong secondary items were included in the factor score calculations, and each factor had an equal number (n = 4) of items included in its factor score calculations.

After a factor score was calculated for each participant on each of the four factors, the individual factor scores on each factor were summed to create a single ∑FactorScores for each factor. Then, to take into account missing data for participants who did not respond on all items, the average or Mean∑FactorScores was calculated. This was the final measure used to compare the relative predicted influence strengths of the four factors. Because factor scores were based on participants ratings of influence items, higher Mean∑FactorScores could be interpreted as representing greater predicted influence on the future of public education. The ∑FactorScores, Mean∑FactorScores, and rank ordering of the four factors are shown in Table 4.

Demographic Group Differences on Predicted Factor Influences

Differences in the comparative predicted influences of the four factors identified in the factor analysis were examined by dividing the participants on gender, age, and whether or not they were educators. For the gender analysis, factor scores were compared for males (n = 166; 42.3% of sample) and females (n = 281;

62.9%). For the educator/general population analysis, comparison was made for those who were employed in education (n = 189; 42.3%) and those who were not (n = 258; 57.7%).

For the age analysis, the sample was divided between those who were aged between 18 and 30 (n = 180; 40.3%) and those aged over 30 (n = 263; 58.8%). Participants who did not report their age (n = 4; .9%) were eliminated from this analysis. The age of 30 was selected as the cut point between the younger and older age group for this study because it fits two important age modeling paradigms. One paradigm is Prensky's (2001) split between digital natives—people born after the late 1970s, after general implementation of digital technology, and familiar with technology throughout their lives—and digital immigrants—those born before the late 1970s. The second paradigm supporting the use of age 30 as the younger/older division is Howe and Strauss's (2000) Millennial generation, identified as those born from the early 1980s to approximately present time. Both these age divisions reportedly have different technology and social characteristics that were believed might influence their perceptions of the most important influences on American public education.

To compare potential differences in the predicted educational influences of the four factors identified in this study by these various demographic groups, the mean factor scores for the groups on each of the four factors were calculated. Independent sample *t*-tests were then run on the mean factor scores for each pair of demographic groups on each factor. Mean factor scores and statistical significance of the differences are presented in Table 5.

As shown in Table 5, mean factor scores for all four factors for all demographic groups were similar to each other, and also to the scores for the entire sample as reported in Table 4. Females viewed all four factors as slightly more influential on education than did males. While these gender differences reached statistical significance, only one was large enough to have possible practical importance. The females' higher mean factor score (16.06) than the males' (14.97) on Factor 4: Meeting Ethical Responsibilities may be large enough to merit further investigation.

No significant differences were observed between the younger/older age groups on any factor. There was only one significant difference between the educators/non-educators groups: the educators viewed Factor 3: Maintaining Fiscal Accountability and Competitiveness as slightly more important than the non-educators. However, while this difference reached statistical significance, it was too small to have any practical importance.

Overall, all demographic groups viewed the four factors quite similarly, and each group's mean factor scores were similar to those of the entire sample. Thus, there was considerable agreement by all demographic groups and the study participants as a whole on the predicted strengths of influence of the four factors on the future of American public education.

Table 5. Mean Factor Scores by Demographic Groups

Influence Factor Number and Name	*Demographic Group*	*Mean Factor Score*	*SD for Factor Scores*
1 Performing General Education Requirements	GENDER		
	Male	16.32	2.36
	Female	16.78*	2.47
	AGE GROUP		
	18–30	16.44	2.47
	>30	16.58	2.28
	EDUCATORS		
	Yes	16.73	2.40
	No	16.52	2.47
2 Servicing Learning Needs	GENDER		
	Male	15.25	2.55
	Female	15.91*	2.76
	AGE GROUP		
	18–30	15.64	2.65
	>30	15.41	2.55
	EDUCATORS		
	Yes	15.83	2.58
	No	15.55	2.78
3 Maintaining Fiscal Accountability and Competitiveness	GENDER		
	Male	14.87	2.49
	Female	15.46*	2.67
	AGE GROUP		
	18–30	15.10	2.64
	>30	15.21	2.44
	EDUCATORS		
	Yes	15.62*	2.29
	No	14.97	2.80
4 Meeting Ethical Responsibilities	GENDER		
	Male	14.97	2.80
	Female	16.06*	2.67
	AGE GROUP		
	18–30	15.80	2.69
	>30	15.44	2.62
	EDUCATORS		
	Yes	15.90	2.66
	No	15.48	2.83

*Difference statistically significant at $p \leq .05$

Conclusions and Discussion

The findings of this study support several important conclusions. First, all 13 individual items included in the study were predicted to be at least moderate influences on the future of American public education. Mean importance ratings ranged from 3.48 to 4.40 on a 5-point scale, suggesting that the study successfully captured items viewed as important by the study's participants. The single strongest predicted influence on future educational practice was identified as *keeping up with current technology.* This was followed by *meeting individual learner needs, gaining adequate funding, promoting technology literacy and skills,* and *making technology available to everyone.* All these were rated by the study's participants as 4.0 or higher, or "major influences" on the future of education. The emergence of these influences offers a picture of 21st-century education as an effort to find fiscal resources to maintain relevant emerging technologies and to make them effectively available to all learners in ways that address their individual abilities and needs.

The study's second conclusion is that the 13 influences were perceived by the participants as clustered into four clearly delineated factors: Factor 1—*Performing General Education Requirements;* Factor 2—*Servicing Learning Needs;* Factor 3—*Maintaining Fiscal Accountability and Competitiveness;* Factor 4—*Meeting Ethical Responsibilities.* These four factors were viewed as similar in importance for the future of education, but Factor 1 encompassing the general obligations of keeping up with current technology and making it available and understandable to everyone was seen as the most important task for education if it is to forge a successful future.

The third major conclusion is that the predictions and perceptions of all major demographic groups represented in the study were similar. Males and females, younger digital natives and older digital immigrants, educators and the general public: All had similar ratings and rankings for the individual influences and the factors in the study. Despite their different experiences and perspectives, all these groups demonstrated strong similarities in their predictions of what imperatives would exert the strongest influences on the future of education and its practice in the 21st century.

This study offers a snapshot of current predictions for the future of American public education and the forces that will influence its development and success in a new century of disruptive technologies and changing inflection points. The picture is quite consistent for all major demographic groups in the study. Across the experience gaps of gender and generational technology histories, and across the needs of classrooms and communities, the view of an educational future impacted by a clear set of responsibilities and challenges emerged from this study. Scharmer's (2009) Theory U advocates the art of "presencing" to sense the future that is trying to emerge, learn from it as it appears, and lead others to work collectively and creatively to produce a *desired* future from the one

that is struggling to emerge. It offers an opportunity to use the findings of this study to shape a successful future for the nation's educational system.

Returning to the quotations that opened this paper, education must change in order to progress. If we can use predictions about our future to invent what we want it to become, the bird we release from the shell of our past may find the wings to lead new generations of learners to become all that they can. This could be an educational future based on re-imagined curricula and technologies whose natural habitat is not textbooks, but rather the concerns, experiences, hopes, and dreams of real people and the world in which they live, strive, and succeed.

References

Ausburn, L. J. (2003). Beyond the inflection point: The softer side of learning's new digital landscape. *Scholar–Practitioner Quarterly, 2*(1), 79–97.

Ausburn, L. J., & Ausburn, F. B. (2010, December). *Spheres of reality: A conceptualization of desktop virtual environments in career and technical education and an implementation training model*. Paper accepted for presentation at Career and Technical Education Research and Professional Development Conference, Las Vegas, NV.

Ausburn, L. J., Ausburn, F. B., & Kroutter, P. (2010). An exploration of desktop virtual reality and visual processing skills in a technical training environment. *i-manager's Journal of Educational Technology, 6*(4), 44–56.

Ausburn, L. J., Martens, J., Dotterer, G., & Calhoun, P. (2009). Avatars, pedagogical agents, and virtual environments: Social learning systems online. *i-manager's Journal of Educational Technology, 5*(4), 1–13.

Berg, G. A. (2005). *Lessons from the edge: For-profit and nontraditional higher education in America*. Westport, CT: Praeger/American Council on Education Series in Higher Education.

Canton, J. (1999). *TechnoFutures: How leading-edge technology will transform business in the 21st century*. Carlsbad, CA: Hay House.

Canton, J. (2006). *The extreme future: The top trends that will reshape the world for the next 5, 10, and 20 years*. New York: Penguin Group/Dutton.

Cross, J. (2007). *Informal learning: Rediscovering the natural pathways that inspire innovation and performance*. San Francisco, CA: John Wiley & Sons.

Darling-Hammond, L. (2010). *The flat world and education: How America's commitment to equity will determine our future*. New York: Teachers College Press.

Egan, K. (2008). *The future of education: Reimagining our schools from the ground up*. New Haven, CT: Yale University Press.

Fletcher, G. (2010). Follow the content. *Campus Technology, 23*(11), 4.

Friedman, T. L. (2007). *The world is flat 3.0: A brief history of the twenty-first century*. New York: Picador.

Gates, B. (1999). *Business @ the speed of thought: Using a digital nervous system*. New York: Warner Books.

Green, S. B., & Salkind, N. J. (2005). *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (4th ed.). Upper Saddle River, NJ: Pearson Education.

Grove, A. S. (2002, April). Strategic points. *Executive Excellence, 19*(4), 4–5.

Howe, N., & Strauss, W. (2000). *Millennials rising: The next great generation.* New York: Vintage Books.

Kachigan, S. K. (1991). *Multivariate statistical analysis: A conceptual introduction* (2nd ed.). New York: Radius Press.

Kennard, J. (2010). *A framework for social learning in enterprise Part 2*. Training Zone: Learning Technologies, August 9, 2010. Retrieved October 10, 2010, from http://www.trainingzone.co.uk/topic/social-learning-and-enterprise-part-2/146205

Marx, G. (2006). *Sixteen trends, their profound impact on our future: Implications for students, education, communities, countries, and the whole of society.* Alexandria, VA: Educational Research Services.

Negroponte, N. (1995). *Being digital.* New York: Vintage Books.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw Hill.

Phillips, J. J., & Phillips, P. P. (2007). *Show me the money: How to determine ROI in people, projects, and programs.* San Francisco, CA: Berrett-Koehler Publications.

Pine II, B. J. (1993). *Mass customization: The new frontier in business competition.* Boston, MA: Harvard Business School Press.

Prensky, M. (2001). *Digital natives, digital immigrants: A new way to look at ourselves and our kids.* Available at http://www.marc.prensky.com/writing/

Project Tomorrow. (2010). *Unleashing the future: Educators "Speak Up" about the use of emerging technologies for learning.* Retrieved May 15, 2010, from http://www.tomorrow.org/ speakup/pdfs/SU09UnleashingTheFuture/pdf

Scharmer, C. D. (2009). *Theory U: Leading from the future as it emerges—The social Technology of presencing.* San Francisco, CA: Berrett-Kochler Publications.

Sheskin, D. J. (2007). *Handbook of parametric and nonparametric statistical procedures.* New York: Chapman & Hall/Taylor & Francis Group.

Stevens, J. (1996). *Applied multivariate statistics for the social sciences* (3rd ed.). Hillsdale, NJ: Lawrence Earlbaum.

Tapscott, D. (1998). *Growing up digital: The rise of the net generation*. New York: McGraw-Hill.

Tapscott, D., & Williams, A. D. (2007). *Wikinomics: How mass collaboration changes everything.* New York: Penguin Group.

Wright, S. W., & Yates, E. L. (1999). Distance learning: The fascination with education via dancing electrons raises questions about access, equality, and outcomes. *Community College Week, 11*(22), 6–9.

About the Authors

Lynna J. Ausburn is an associate professor of occupational education studies at Oklahoma State University. She has worked in and with 19 different countries though several major international organizations. Her teaching emphases include adult workforce development, instructional technology, and research methods. Her extensive research publications and professional presentations have focused on emerging instructional technologies and their interactions with learner characteristics and learning tasks. Her current research interests include virtual reality in technical training and educational futures. She may be reached via e-mail at: lynna.ausburn@okstate.edu

Andrea M. Ellis is the district program specialist for Ponca City Public Schools in Oklahoma and a doctoral student in occupational education studies at Oklahoma State University. She has 10 years of experience in education including program development and teaching at the middle school, high school, and undergraduate levels. Her research interests include teacher preparation, teacher retention, educational technologies, and curriculum design. She may be reached via e-mail at: andrea.ellis@okstate.edu

Earlene Washburn is the owner of Stellar Consulting Services, specializing in financial planning. She is also a doctoral student in occupational education studies at Oklahoma State University and has served as adjunct faculty in higher education. Her research interests include virtual reality applications, online learning, and cross-cultural studies in distance learning. She may be reached via e-mail at: earlene.washburn@gmail.com