Technology in Academic Advising: Perceptions and Practices in Higher Education

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White paper on the findings from the 2013 *NACADA Technology in Advising Commission* sponsored survey.

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Abstract

Technology has the ability to scaffold academic advising and student support practices in higher education. The student and faculty perspective on campus technology are often assessed; however we rarely understand how technology impacts staff that support student success and academic advising practices. The 2013 Technology in Advising Use in Higher Education survey was designed to learn about how advising staff, faculty, and administrators utilize technologies for in their academic advising practices. In cooperation with the Global Community for Academic Advising (NACADA) association and the NACADA Technology in Advising Commission, this study is concerned with how technology is being used and integrated into academic advising practices and services on campus. Where appropriate, the 2013 Technology in Academic Advising survey will discuss the current findings, and offer insights to previous NACADA surveys which review technology use (i.e. 2002, 2007, and 2011), and provide considerations for implications and future assessments of technology use in higher education.

Key words: advising; technology; NACADA Technology in Advising Commission; higher education; academic advising.

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Introduction

With increasing opportunities for digital and connected learning experiences, our students also bring expectations for our campus technology. The last decade in post-secondary education has undergone some economic realities and considerations for new business models as this sector adopts new teaching approaches, embraces the demand for distance learning, and continues to push forward with emerging technologies to increase efficiencies and alter pedagogical approaches (Anderson, Boyles, & Rainie, 2012). The influence of technological innovation has not gone unnoticed as the growth of learning analytics, microcredentialing, competency-based education (CBE), personalized adaptive learning, curricular optimization, open educational resources, shared services, articulation agreements, flipped classrooms, and one-stop student services increase within higher education (Mintz, 2014). With the increased demand to support innovative technological practices compounded with external pressures for transparency, accountability, and cost (The Whitehouse, n.d.), it even more critical to assess campus stakeholders' use of technology in higher education. Finally, the changing learner demographics impact our approaches to teaching, learning, and support at our institutions. This will now require our colleges and universities to consider different approaches for learner support, which includes considerations for how staff and faculty use technology to increase effectiveness across a diverse student body for individualized learning and flexible delivery (Bates, 2015). Based on these challenges and changes, it will be critical for higher education to consider evidence-based approaches to integrate technological into their pedagogy, programs, and resources.

One distinct area in higher education impacted by rapid digital adoption is academic advising and student support services. Our colleges and universities are now investing and implementing

technologies to manage student information, communicate academic planning, signal academic concerns, and monitor progress through to degree completion. Lumina Foundation (2014) found that the average time for a four-year bachelors degree in the United States is now extended to seven years. Knowledge and awareness for academic progress coupled with learner assistance is one of the many positive affordances of utilizing campus-wide technology for advising practices. Through strategic deployment of advising technologies, with regards to communication and student information management, both students and advisors can benefit by having access to both data and meaningful learner support resources (Pasquini, 2013). That being said, it will be critical for our colleges and universities to be proactive with technological solutions to offer seamless support, effectively manage student progress, and optimize resources for success and retention.

As change is constant in higher education, colleges and universities will need to engage in strategic sustainable planning for technological innovation, which may also influence collaborative programming and partnerships, integrative services and functions, and support rapid technology adoption to allow learning to be more personal, affordable, effective and accessible (Contact North, 2015). Whether it is institutional change or technological necessity, we need a way to encourage advising programs to consider technology for both content and service delivery for advisee-centered approaches (Steele, 2015, 2014). By researching technological practice and experiences of academic advisors, this white paper outlines the current advising perspective in higher education. It is necessary to conduct campus-wide assessments and establish strategic plans for advising stakeholders to effectively integrate technology into advising and student support practices that both aligns with the advising units' objectives and meets the institutional goals (Pasquini, 2013). To better understand the how technology is being utilized in the field of academic advising, this study seeks to learn about current use, perceptions, and perspectives from higher education staff and administration.

Background

The Global Community for Academic Advising (NACADA) association and educators in the post-secondary sector, who are designated to provide academic advising and/or student support, are experiencing an influx of technology in their practice. Higher education has adopted advising analytics (Campbell, DeBlois, & Oblinger, 2007), e-portfolios for advising (Chen & Black, 2010), academic decision-making tools (Feghali, Zbib, & Hallal, 2011), collaborative filtering for elective course recommendations (Ray & Sharma, 2011), predictive data analytics (Phillips, 2013), and the influence of using social media for academic advising (Amador & Amador, 2014). The creation of a new survey instrument was designed to capture data to reflect how higher education advising staff and senior administration employ technology to support their practices. Prior survey instruments from NACADA (e.g. 2002, 2007, and 2011) reviewed advising and technology; however our research group was limited as these original survey instruments included a number of technology items that are now obsolete for advising (e.g. overhead projectors, Netscape web browser, and Palm Pilots).

Needless to say, information about the perception, experiences, and perspectives from the field of academic advising existed to compare to current research findings related to higher education teaching and learning with technology (e.g. 2014 ECAR Student and Faculty Technology Research Studies or 2014 and 2015 National Student Survey of Engagement: Learning with Technology Module). By researching technological trends and challenges, conducting campus-wide assessments, and establishing strategic plans, advising stakeholders in

higher education can effectively integrate technology into advising and student support practices to align with individual advising units' objectives and the goals of the institution (Pasquini, 2013). This research will provide information about the perceptions for technology among advising and student support staff, to understand the experiences higher education institutions encounter with technology beyond the traditional learning (student) and teaching (faculty) roles.

Research Methods

Modeled after the 2011 and 2012 National Study of Undergraduate Student and Information Technology (Dahlstrom, de Boor, Grunwald, & Vockley, 2011; Dahlstrom, 2012) and the National Survey of Student Engagement (2012) topical module on *Learning and Technology* (see Table 1), the NACADA Technology in Advising Commission sponsored[2] this research to understand how staff, faculty, and administrators are impacted by technology at their post-secondary education institutions. The purpose of this study was to understand how academic advisors and support staff in higher education use technology and explore their perceptions of technology use in advising practice compared to other populations on campus.

Data Collection

The web-based survey was available for completion from February to April 2013. Notification of availability and a request to complete the survey was sent to all NACADA members via e-mail and a link to the survey. The survey was distributed by the University of North Texas and was reviewed and approved by their Institutional Review Board. Participants were informed of the purpose and procedures of the study. Questions asked to assess the demographic profile of those who completed the survey were similar to the questions asked in the 2002 and 2007 technology surveys; thus permitting comparisons. The full survey is available for download and licensed under a Creative Commons 4.0 International License online (Pasquini & Steele, 2015a) for further review, and to support scholarly research inquiry in the area of advising and technology.

Analysis

The survey was sent to all NACADA members (N=11,418). A total of 990 NACADA members completed the survey, for a response rate of 8.67% of the NACADA membership as of February 2013. Of the respondents, 78% were female and 21% were male, with the remaining 1% not identifying. The highest percentages of respondents were between the ages of 30 and 39 years (n=236; 31%) with the next highest being between 40 and 49 years-of-age (n=180; 24%). The third highest age cohort was ages 22-29 years (n=159, 21%). These three cohorts made up 70% of all respondents.

The campus role of academic advisor/counselor by far made up the majority of respondents' roles, with 65% self-identifying as in this role (n=493). In Table 1 there is specific respondent demographic information from those who participated in the 2013 survey. Table 1 identifies further demographic information for those who participated in the survey.

Table 1.
Survey respondent demographics.

Gender	
Male	78%
Female	21%
Total	99%

[2] Thank you to the NACADA Technology in Advising Commission for their sponsorship, and acknowledgement for the 2013 NACADA Technology in Academic Advising survey development and findings review should also be given to the following contributors: Paul Cox, University of Iowa; Shannon L. Burton, Michigan State University; Jennifer P. Hodges, New Mexico State University; Rich Robbins, Bucknell University; and Marsha Miller, NACADA Executive Office.

Age Range	
22-29	21%
30-39	31%
40-49	24%
Total	76%
Campus Role	
Advising administrators	22%
Academic advisor/counselor	65%
Faculty advisors	4%
Total	91%
Institutional Type	
4-year public	66%
4-year private	20&
2-year	12%
Total	98%

The 2013 research data set is available for review online (Pasquini & Steele, 2015b) with comparative demographic breakdown between the NACADA Technology in Advising Commission sponsored surveys from 2002, 2007, and 2013 shared in Appendix A and Appendix B.[3]

Results

In this section we will share the responses for the multiple-choice questions two to five of the 2013 survey as outlined in Tables 2 through 5. The survey data revealed the following most common technologies academic advising utilized were: 1) hardware desktop computer (87.54%), campus network storage (72.08%), Wi-Fi (46.83%), and laptops (28.14%) on a daily basis; 2) scanners (31.03%), social networks (27.25%), and learning management systems (LMS) (22.14%) a weekly basis; and 3) scanners (25.25%), digital cameras (24.03%), laptops (22.91%), collaborative editing sofware (22.58%), and webcams (20/8%) on a monthly basis. Interestingly enough, respondents from this survey indicated that they never use the following technologies for academic advising: smartphones or mobiles (55.95%), multimedia (55.95%), mobile enhanced websites (64.96%), and online portfolios/e-portfolios (82.98%) are never being utilized within the academic advisors role.

These results could be cross referenced to student responses locally by use of the NSSE Technology Module survey - Question 3 from NSSE: "During current school year, how often have you used the following technologies in your classroom?" Included items were: electronic textbooks, online portfolios or e-portfolios, blogs, collaborative editing software, (Wikis, Google Docs, etc.), multimedia software, social networking (Facebook, Twitter, etc.), and mobile computing (handheld devices such as smartphones, tablets, etc.

There is a strong relationship between question 2 (Table 2) and questions 3 (Table 3), in that, the top eight responses for each question are similar. Respondents to the survey indicated that their desktop computer and local/campus network storage were the primary ways to advise using technology. It appears the use of the LMS or any online portfolio/e-portfolio is often encouraged by institutions; however less frequently utilized by advisors.

Data from question 4 (Table 4) indicates advisors typically use technology to communicate with multiple individuals who hold various roles across the institution, including: Academic Advisors/Counselors (86.35%); Academic Administrators (58.08%); Student Affairs Administrators (37.01%); Other Administrative Staff and Offices on Campus (54.72%); Faculty (47.22%); and Students (89.88%). Moreover, the pattern here reflects technology communications strongly directed towards to students, other advisors, and advising administrators.

[3] Appendix B provides response data regarding the technology questions asked in 2013 related to comparable question in the EDUCAUSE/ECAR 2011 and NSSE 2012 surveys, while Appendix C provides data comparing questions from the 2013 survey to similar questions on the 2002 and 2007 NACADA surveys regarding the use of different technologies in advising. In general, e-mail was the most used technology in 2002 and 2007 and remains the most used in 2013.

Table 2.
Q2. During the current school year, how often have you used the following technologies in your advising practice?

Technology Used for Advising	Daily	Weekly	Monthly	Never
Desktop computer	87.54%	1.33%	2.34%	8.79%
Campus network storage	72.08%	11.01%	5.12%	11.79%
Wi-Fi	46.83%	15.91%	15.13%	22.14%
Scanner	23.58%	31.03%	25.25%	20.13%
Social networks, e.g., Twitter, Facebook	23.36%	27.25%	18.13%	31.26%
Laptop	28.14%	16.13%	22.91%	32.81%
Learning Management System (LMS) e.g. Blackboard, Moodle	24.03%	22.14%	16.57%	37.26%
Cloud/Virtual storage e.g. Google Drive, Dropbox	22.69%	15.57%	16.13%	45.61%
Mobile -Smartphone	23.80%	10.23%	10.01%	55.95%
Mobile enhanced website	16.13%	10.79%	8.12%	64.96%
Collaborative editing software e.g. wikis, Google docs	8.57%	14.46%	22.58%	54.39%
HDTV/TV Monitors	13.68%	7.79%	13.01%	65.52%
Mobile application(s)	13.90%	8.90%	8.23%	68.97%
Mobile computing-Tablet	10.90%	11.79%	11.01%	66.30%
Multimedia (edit/publishing)	6.34%	12.68%	21.02%	59.96%
Customer Relationship Management (CRM) system e.g. RightNow, Hobsons	13.12%	3.56%	4.56%	78.75%
Blogs e.g. WordPress	4.34%	8.34%	13.24%	74.08%
Digital camera	0.44%	4.67%	24.03%	70.86%
Webcam	0.89%	3.34%	20.80%	74.97%
Online portfolios/e-portfolios	3.56%	3.45%	10.01%	82.98%
iPod or mp3 player	3.78%	3.11%	2.89%	90.21%
Netbook	2.11%	2.45%	4.23%	91.21%
Electronic textbooks	1.22%	2.78%	4.67%	91.32%
Electronic textbook readers	1.11%	2.34%	3.56%	92.99%
Gaming devices/consoles	0.33%	1.22%	1.78%	96.66%

Responses to question 3 (Table 3) are consistent when typical technologies emphasized for academic advising at higher education institutions. In looking at the combined positive findings for devices used on campus (i.e. “strongly agree” and “agree”), it is not surprising to see desktop computers (97.52%) and laptops (76.95%) ranked high in use for advising. With the increasing amount of campus stakeholders bringing their own device to campus in higher education (Dahlstrom & diFilipo, 2013), it was surprising to see that less than half of the respondents surveyed indicated their college/university has a mobile-enhanced website (47.59%), and even fewer indicated institutional support for mobile devices, such as tablets (44.42%) or smartphones (33.27%),

Table 3.
Q3. My institution strongly emphasizes the use of the following technologies for academic advising.

Technology for Advising	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
Desktop computer	87.84%	9.68%	1.86%	0.62%	806
Campus network storage	54.39%	32.05%	8.51%	5.05%	752
LMS e.g. Blackboard	45.83%	33.89%	14.03%	6.25%	720
Wi-Fi	43.50%	34.89%	13.70%	7.91%	708
Laptop	39.83%	37.13%	15.08%	7.97%	703
Scanner	28.59%	45.40%	18.53%	7.47%	696
Social networks	19.03%	49.79%	23.31%	7.86%	725
Cloud/Virtual storage	19.61%	30.88%	30.56%	18.95%	612
CRM system	23.49%	21.29%	36.55%	18.67%	498
HDTV/TV Monitors	14.38%	34.14%	34.14%	17.33%	577
Collaborative software	13.68%	34.04%	36.32%	15.96%	614
Mobile enhanced website	15.12%	32.47%	34.02%	18.38%	582
Multimedia software	11.47%	36.26%	36.26%	16.02%	593
Mobile computing-Tablet	12.92%	31.50%	34.16%	21.42%	565
Blogs	10.26%	28.38%	44.62%	16.75%	585
Online or e-portfolios	10.78%	28.07%	40.71%	20.45%	538
Mobile application(s)	9.39%	27.08%	40.25%	23.29%	554
Webcam	5.15%	33.79%	40.31%	20.75%	583
Mobile computing-Smartphone	9.11%	24.17%	42.38%	24.34%	571
Electronic textbooks	6.16%	22.27%	47.12%	24.45%	503
Netbook	8.18%	20.34%	43.40%	28.09%	477
Digital camera	4.76%	24.19%	45.14%	25.90%	525
E-textbook readers	4.67%	20.33%	49.39%	25.61%	492
iPod or mp3 player	1.88%	8.54%	54.58%	35.00%	480
Gaming devices/consoles	0.65%	4.97%	50.54%	43.84%	463

Table 4 (question 4) demonstrates daily contact, using technology, was utilized for communication with academic advisors/counselors (86.35%) and students (89.88%) in higher education. Although part of advising on campus, it appears respondents has less frequent (daily) communication using technology with academic administrators (58.08%) or faculty (47.22%).

Table 4.
Q4. During the academic year, how often have you used technology to communicate with:

Institutional Stakeholder(s)	Daily	Weekly	Monthly	Each Semester	Never
Academic Advisors/Counselors	86.35%	10.27%	2.17%	1.09%	0.12%
Academic Administrators	58.08%	28.80%	8.75%	2.67%	1.70%
Student Affairs Administrators	37.01%	29.41%	18.26%	11.76%	3.55%
Other Administrative Staff and Offices on Campus	54.72%	31.72%	8.96%	3.75%	0.85%
Faculty	47.22%	30.39%	14.29%	6.42%	1.69%
Students	89.88%	7.35%	1.69%	0.84%	0.24%

Table 5.
Q5. Please identify how frequently you use these technologies.

Type of Technology	Daily	Weekly	Monthly	Each Semester	Yearly	Never
Email	98.87%	0.75%	0.00%	0.13%	0.00%	0.25%
Face-to-Face Interaction	90.83%	5.03%	1.26%	0.88%	0.50%	1.51%
Locally installed Word processor, spreadsheets, e.g. Word, Excel, PPT	80.03%	12.56%	2.26%	1.01%	0.13%	4.02%
Phone	73.49%	19.47%	3.27%	0.63%	0.13%	3.02%
Facebook	29.90%	24.12%	8.54%	5.15%	1.26%	31.03%
Learning Management System (LMS)	28.27%	22.36%	11.93%	5.78%	2.51%	29.15%
Instant Messaging/Online chat	33.79%	11.93%	7.16%	3.89%	2.14%	41.08%
Electronic advising notes system - developed by institution	39.07%	8.29%	1.51%	2.26%	0.75%	48.12%
Text messaging	32.91%	13.07%	4.40%	2.01%	1.38%	46.23%
Degree audit system-developed by institution	35.55%	10.55%	2.76%	2.89%	0.25%	47.99%
Enterprise/Commercial degree audit system	37.06%	8.17%	1.76%	1.63%	0.38%	51.01%
Web-based word processor e.g. Google Docs	22.74%	14.07%	11.43%	5.53%	3.27%	42.96%
LinkedIn	6.03%	20.48%	14.45%	4.65%	1.76%	52.64%
Video-sharing websites, e.g. YouTube	4.40%	13.07%	16.71%	12.81%	4.27%	48.74%
Recommend websites or share via social tagging or "liking"	10.80%	14.82%	7.54%	4.40%	1.26%	61.18%
Twitter	10.30%	11.93%	5.90%	3.27%	1.63%	66.96%
Retention software - developed by institution	11.43%	7.41%	6.91%	4.90%	1.13%	68.22%
Enterprise e-advising notes	17.84%	4.65%	1.01%	1.63%	0.50%	74.37%
Video conferencing e.g. Skype, Google Plus Hangout	1.88%	7.16%	14.32%	11.06%	4.77%	60.80%
VoIP or Phone Communication over Internet (e.g. Vonage/Skype)	9.30%	4.90%	6.66%	6.53%	3.89%	68.72%
Webcasts	0.88%	3.02%	12.56%	15.58%	6.91%	61.06%
Presentation and document sharing websites, e.g. SlideShare	3.77%	5.28%	8.42%	5.03%	3.77%	73.74%
Other social networking sites	5.28%	8.04%	4.02%	2.26%	1.26%	79.15%
Enterprise video conferencing (e.g. Wimba, Adobe Connect)	1.01%	3.39%	10.80%	7.29%	5.28%	72.24%
Wikis	1.63%	6.41%	8.29%	4.27%	3.02%	76.38%
Enterprise retention software	7.16%	4.65%	2.64%	2.51%	0.63%	82.41%
Photo-sharing website e.g. Flickr	1.38%	4.52%	7.29%	5.28%	2.89%	78.64%
Podcasts	0.63%	3.14%	6.41%	7.66%	4.90%	77.26%
Social studying sites (e.g. OpenStudy)	0.38%	0.75%	0.88%	1.26%	0.38%	96.36%

As shown in Table 6, responses to question 6 indicate that advisors feel their institutions provide them with access to resources to help them perform their duties. A number of the responses were positive with strongly agree or agree; however it should be noted that "disagree" was omitted from inclusion on the survey instrument by mistake. In general, advisors believe that technology on their campus for 1) Reviewing student academic progress (98.32%); 2) completing administrative activities (97.86%); 3) degree and course planning with students (97.78%); 4) a range of campus support areas to help students (95.03%); and 5) student interventions (93.38%).

Table 6.
Q6. Technology in advising at my institution gives me access to resources for…

Application of Technology to Support Advising Role	Strongly Agree	Agree	Strongly Disagree
Reviewing student academic progress.	79.02%	19.30%	1.68%
Completing administrative activities.	69.16%	28.70%	2.14%
Degree and course planning with students.	72.62%	25.16%	2.22%
Student intervention(s).	55.15%	38.24%	6.62%
A range of campus support areas to help students.	53.55%	41.48%	4.97%

Advisors identify that technology improves the quality of their work and helps them better serve their students with their responses to question 7 (see Table 7) being either a "strongly agree" or "agree" in the following ranking order of how technology allows for productivity: 1) Helps me do my work faster (91.6%); 2) Gives me an efficient way to store my work (90.45%); 3) Allows me to produce higher quality work (89.41%); 4) Makes my role as an advisor on campus easier to do my job (88.72%); and 5) Simplifies academic advising administrative processes (82.44%). With the complex nature of advising requirements and expectations to support the holistic student, that is, academic standing, personal success, and future planning, it is unfortunate that technology is not more streamline and simple when supporting the advising role or function. It is interesting to learn the perceptions for advising technology that is directed by the institution. Colleges and universities select various CRMs, LMS, and student information systems to support the tracking and guidance for academic advisors. Many of our campus-wide enterprise systems are often selected, purchased, and implemented without much consultation from the advising front line employees who utilize these technological applications to support advising.

Table 7.
Q7. Technology in advising at my institution makes me more productive by…

Productivity with Advising Technology	Strongly Agree	Agree	Disagree	Strongly Disagree
Helps me do my work faster.	60.18%	31.42%	6.87%	1.53%
Allows me to produce higher quality work.	54.21%	35.20%	8.42%	2.17%
Gives me an efficient way to store my work.	60.25%	30.19%	7.39%	2.17%
Simplifies academic advising administrative processes.	47.82%	34.62%	13.72%	3.85%
Makes my role as an advisor on campus easier to do my job.	53.59%	35.13%	9.10%	2.18%

For question 8 (Table 8), advisors clearly feel that technology helps them feel more connected. These are the ways advisors "agree" or "strongly agree" with how technology at their institution helps them feel connected, in ranking order: 1) Allows me to connect to institutional staff (94.49%); 2) Allows me to connect to students I advise (92.53%); 3) Lets me know what is happening on campus (89.2%2); 4) Allows me to connect to institutional faculty (88.85%); 5) Allows me to connect to advising faculty/professionals outside my institution (84.72%); 6) Lets me know what is going on in higher education (83.33%); 7) Gives me access to experts in my field (79.95%); and 8) Allows for effective student scheduling for advising appointments (76.32%). The trend is that local connections to student, staff, and institutional faculty are primary; while external campus connections to what is occurring on campus, higher education, or access to experts in the field are secondary. It is interesting that technology was ranked the lowest in this positive category for supporting "effective student scheduling for advising appointments."

Table 8.
Q8. Technology in advising at my institution helps me feel connected in the following ways…

Connection with Advising Technology	Strongly Agree	Agree	Disagree	Strongly Disagree
Allows me to connect to students I advise.	55.03%	37.50%	6.70%	0.77%
Allows me to connect to institutional staff.	53.46%	41.03%	5.00%	0.51%
Allows me to connect to institutional faculty.	44.75%	44.10%	9.99%	1.17%
Allows me to connect to advising faculty/professionals outside my institution.	41.37%	43.35%	11.33%	3.95%
Allows for effective student scheduling for advising appointments.	45.74%	30.58%	16.23%	7.44%
Lets me know what is happening on campus.	41.52%	47.69%	7.97%	2.83%
Lets me know what is going on in higher education.	40.31%	43.02%	12.79%	3.88%
Gives me access to experts in my field.	35.91%	44.04%	14.29%	5.77%

In question 8 (Table 8) it is interesting to note technology was ranked the lowest in the "positive category" (i.e. "agree" and "strongly agree") for supporting "effective student scheduling for advising appointments. 23.67% do not find their current institutional system for scheduling appointments to meet the standard of either the advisor and/or advisee. This question presented bi-modal findings from the survey responses, which indicates a lack of consensus for how technologies are truly connecting advisors to students, staff, faculty, and resources on campus. To further this notion, many advisors appear to be split on how advising technology can support linking them to resources, experiences, and trends within higher education. Further exploration into this topic will be shared as we explore the comments shared within the survey in the following section.

Responses to open-ended questions

Most respondents addressed the question of ideal technology in advising practice (question 9) from either a philosophical lens or a functional lens. Through a philosophical lens, respondents addressed "ideal technology in advising practice" by discussing the power of technology in meeting the needs of distance learners, commenting on the power of technology to empower students and describing technology as a tool to use in advising but not as a replacement for advisors or advising. Respondents of the

survey shared their thoughts on ideal technology in advising practices:

> *"My ideal technology in advising practice would be the seamless integration of technology with advising, where students no matter their campus location had equal ability to access me when they needed me. Right now students at our home campus have a distinct advantage over their counterparts at distant locations"*
>
> *"Additionally, it would be beneficial to have a social media hub to manage and ensure that our message is being uniformly pushed on each platform in ways that are unique to that platform."*

In a similar vein, respondents commented on the value of face-to-face advising interactions. Sample responses included:

> *"I think face-to-face interaction is ideal, but technology is especially useful when doing distance advising, especially video conferencing/Skype."*
>
> *"The ability for me to have an easy to way of showing students how far along they are in their degree program is important, because it gives our students an ability to see a tangible indicator of how close they are to graduating."*
>
> *"Letting the student see their progress. Ideally, students would use email and phone to get in touch with Academic Advisors for questions and actually come in when situations warrant face-to-face interaction."*
>
> *"Technology for scheduling, registration, and degree planning is great, but technology used as the sole way to communicate with students hinders the advising relationship."*
>
> *"The technology helps connect and tells the what they have to take. My actual connection with them personally and the discussion we have gets at the important questions of why they take a course and what it means for them as humans."*
>
> *"Technology should be a facilitator, not a substitute, for meaningful interaction with advisors and faculty."*

Other respondents thought that improved technologies would allow for more ideal technology in advising practices:

> "Mobile friendly website design, active in social media but still maintain the face-to-face interaction with students. Students need to *have that 'touch' so that they know someone on campus cares about their academic success."*
>
> *"I prefer to use technology primarily for record keeping and accessing student information. Even though it seems like my students would prefer to communicate exclusively with texting I have yet to be convinced that face-to-face contact isn't still the best way to connect with them and to do my job."*

Respondents also shared ideas about the functional aspects of technology in advising practice including technology as a communication tool, the overall characteristics of technology tools, and specific functions they used or would like to be able to access. Respondents discussed how they used technology to interact with students via email as well as social media. The characteristics respondents noted when describing ideal technology in advising were having a 360-degree or holistic view of the student, being about to access technology from multiple locations such as home, office residence halls, and other locations, paperless/green systems, and integrated systems so that an advisor would not have to open multiple systems to accomplish their work. Sample responses included:

> "*I would like for technology to play a larger role in my advising practice. I would love to be able to utilize Facebook and Twitter to connect as an individual advisor to my students."*

"An integrated system that includes advising notes, degree audits, appointment scheduling, a communication system with students that also documents those communications in the student's advising file, and incorporates all records regarding students' academic status (e.g. good standing, probation, etc.)."
"Streamlined technology usage. Right now, there are at least 4 systems we use daily (E-mail, PeopleSoft, DegreeWorks, Blackboard) and have three different log ins. A 'one stop shop' where we can log in once and see/use all of our required systems would be wonderful."
"System that integrates academic information, student records, and student connections"
"A tool that allows for students to develop an academic, career and financial plan that also integrates the degree evaluation tool."
"Being able to work from home and still meet the needs of my students."
"Electronic workflows for forms and authorizations to reduce paper and expedite processes for students."
"To be totally web base and not paper base!"

Specific functions of technology for advising practices suggested by respondents include shared notes, scheduling capability, early alert, degree audit and planning tools, online forms, data management, and effective advising workflow.

Discussion and Recommendations

The use of technology remains ubiquitous in the practice of advising. In the typical situation, the advisor's institution decides the tools available for use, and there are commonly used tools across a number of higher education institutions. It is clear the experiences with technology for advising practices is not always streamlined at a single institution and these practices vary between the academic advising field. These messages indicate the need for reviewing the advising workflow and understanding how advising approaches are shifting with the needs of our student populations. Most advisors are comfortable, in general, with the technology they use within their role and function. A number of suggestions for improving advising work and, specifically, how to "advise" students are suggested in the open comments portion of the survey. From the findings and narratives shared in this survey, technology in advising seems to come as an afterthought in higher education. To effectively support student success on campus, our institutions need to recognize the value of technology to scaffold academic advising and student support. It will be critical for institutions to maintain updated, cohesive technology with a streamlined infrastructure and a system of support that is relevant for today's advising practices and needs.

While advisors use technology with all institutional stakeholders on campus, their primary use is with the students, other advisors, and advising administrators. As indicated in the 2011 NACADA Survey (Pasquini, 2011), communication and student information systems help academic advisors and student support services manage the work of the advisor. For technology in advising solutions to be effective they must be part of a strategic campus-wide plan to consider the holistic needs for student success. Other requirements of this would be soliciting for advisor feedback for technological considerations and potential approaches for advising practices. As these technological resources are often selected and purchased by senior administration, it would be helpful to have a campus advisory board to offer comments, feedback, and ask questions during the request for proposals from vendors or when reviewing campus technology solutions. It is also critical to look at the design and delivery of our advising models, to best understand how technology impacts our user experiences and the

barriers to innovating our institutional functions for student support.

To effectively scaffold and implement technology in advising, our higher education institutions need to consider the needs for training and development of advising staff. Recently the ACPA and NASPA (2015) professional associations for student affairs educators have included a Professional Competency Area in Technology to focus on the development knowledge, applied skills, information and digital literacy, leadership and governance for technology, and implementation of technology for assessment and program planning. Part of this learning and support for technology in advising use should be provided by the NACADA organization. Suggestions include, but are not limited to, modeling professional learning and development for technology competencies at the association-level, i.e. embedding technology into the educational programs of the NACADA workshops, seminars, institutes, and conferences. This may also include sharing evidence-based practices, case studies, assessment reports, and research findings from technology in advising practices in higher education. Already we have seen the emergence of online and blended learning opportunities within the association to offer certificate programs for NCAA advisors and in topical areas for professional development in a learning management system, web-casting opportunities for educational programming and meeting needs, and provide NACADA leaders with introduction/orientation videos. It will be critical for NACADA to utilize the members of the NACADA Technology Advisory Board as continued support for improving professional development, communication delivery, and effective information management.

One final thought is observing if in the future there will be increased use, by advisors, of enterprise learning technologies, such as LMS and e-portfolios. Both the argument that advising is teaching and the identification of the need for programmatic learning outcomes in the CAS standards, suggests this is a natural fit and the limited use of these technologies report here should increase.

Conclusion

To understand the perceptions of advising technology in higher education, this study reviewed current use and practices in the field of field of academic advising. To effectively support advising programs with technology, it is imperative that administrative decisions include design and delivery methods focussed on the advisee and support the larger institutional mission. From this study, it is apparent that front-line advising and student support staff have a great awareness of needs and gaps for technology in advising. Our higher education institutions and areas of student support on campus should be encouraged to solicit input during the initial selection phase, and also understand the advising workflow practices prior to any integration of a new advising technology system or tool. It is also critical to offer additional support, learning, and development to scaffold technology in advising practices among your students, staff, and faculty on campus.

We hope that this survey instrument (Pasquini, Steele, & Cox, 2015) and survey data (Pasquini & Steele, 2015b) will provide academic advising administrators and units with resources to scaffold their research for technology in advising planning. In comparing previous survey data from the NACADA Technology in Advising Commission sponsored surveys and utilizing research instruments for technology in higher education from the field, it will be critical for future scholars to continue to build upon and improve the evaluation of technology and its role for evidence-based advising practices and effective student support delivery methods using technology.

To continue the process for interpretation and inquiry, we have included a set of potential questions to discuss with your campus advising division/group

specifically with regards to technology design and delivery at your institution:

1. What are the technology needs for advising practices?
2. Who will support advising-in-technology initiatives or projects?
3. What gaps and needs, if any, in the current advising program can be addressed with technology?
4. Are administrators exploring technology use for campus or advising units?
5. What needs assessment or evaluation, if any, of current technology in advising practices has been conducted?
6. Who will conduct the technology assessment and evaluation process for advising practices and workflow?
7. Will our advising technology solutions serve the entire institution in a holistic way?
8. Will the technological needs of student support or other service units, other than advising (e.g., Registrar's Office, Admissions, etc.), be evaluated and included in your strategic planning?
9. What available resources can you offer to support the technology in advising needs of your students, staff, and faculty?
10. Does the institution have a strategic technology or communication plan for the campus?
11. What are the long- and short-term learning objectives or goals for the advising program?
12. How will research and evaluation of current technological resources be conducted?
13. What department, unit, and/or team will be responsible for the technology assessment, implementation, and deployment process for advising and student support?
14. What factors will facilitate technology implementation? What challenges exist?
15. Which advising team members will be part of the pilot efforts and subsequent implementation of technology (e.g., deployment, review, and update of technology for advising resources)?

With the pressure to evaluate and support our learners through higher education degree completion, it will be necessary to consider evidence-based approaches as we continue to integrate technology into our advising programs. Beyond the investment for maintaining student information systems, monitoring academic progress, and detecting at-risks, pedagogical design and delivery of these advising technologies needs to be considered to ensure access and equity at our institutions. Partnership and consultation among the relevant institutional stakeholders must take priority before selecting a new technological tool for student support. Within this broader conversation the stakeholders will want to address not only how technology help with current configuration of delivering academic advising; but also how technology can change the current configurations of delivering academic advising to enhance it impact on student success.

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Appendix A:
Demographic Comparison of Respondents of Technology in Advising Surveys By Year (2002, 2007, and 2013)

Gender	2002%	2002 N	2007%	2007 N	2013%	2013 N
Female	76%	620	79%	1,670	78%	597
Male	23%	190	20%	416	21%	164
No response	1%	11	1%	25	1%	3
Totals		821		2111		764

Age	2002%	2002N	2007%	2007 N	2013%	2013 N
Under 22		1	0	0	0%	1
22-30 (22-29)	14%	118	14%	291	21%	159
31-40 (30-39)	34%	282	26%	551	31%	236
41-50 (40-49)[4]	NA	NA	23%	481	24%	180
51-60 (50-59)	35%	287	29%	603	17%	132
61-70 (60-69)	4%	33	8%	159	6%	48
Over 70		1		7	0%	0
No Response				19	1%	8
Total					100%	764

Institution/Campus Role	2002%	2002N	2007%	2007 N	2013%	2013 N
Faculty Advisor	8%	64	4%	75	4%	27
Academic Advisor/Academic Counselor	57%	468	54%	1149	65%	493
Personal Tutor	NA	NA	NA	NA	0%	2
Advising Administrator	29%	235	22%	467	22%	165
Upper-Level Advising Administration	NA	NA	13%	274	7%	50
Licensed Counselor	1%	10	NA	NA	0%	3
Staff Assistant(Registrar, Admissions, IT)	0%	3	2	49	1%	7
Other (Graduate Student, not affiliated)	3%	23	1	16	2%	16
No Response			0%	11	0%	1
Total					100%	764

[4] This information was not available in the 2002 NACACA Technology in Advising Commission sponsored survey, as the demographic question was not segmented to inquire about this age range.

Institution Type	2002%	2002 N	2007%	2007 N	2013%	2013 N
Technical	0	NA	0	NA	0%	1
Two-year AA/AS conferring	19%	159	18%	377	12%	92
Four-year private	16%	133	22%	463	20%	149
Four-year public	62%	513	59%	1250	66%	503
For-profit/Proprietary	0	NR	0	NR	1%	11
No Response	2%	16	1%	21	1%	8
Total					100%	764

Institution Size[5]	2002%	2002 N	2007%	2007 N	2013%	2013 N
Less than 2,500	9%	77	11%	233	9%	70
2,501 - 5,000	11%	94	12%	249	12%	90
5,001 - 10,000	19%	155	17%	366	15%	111
10,001 - 20,000	23%	189	20%	460	21%	157
20, 001 - 30, 000	18%	150	20%	420	17%	133
30, 001 - 40, 000	10%	80	8%	170	13%	103
More than 40, 000	8%	67	9%	197	93	12%
No Response	1%	9	1%	16	1%	7
Total					764	100%

[5] Institutional size is based on the number of students enrolled at the institution as selected by the survey respondents.

Appendix B:

Technology questions asked in 2013 related to comparable question in the EDUCAUSE/ECAR 2011 and NSSE 2012 surveys

Technology in Advising Survey Questions	Comparable questions
2. During the current school year, how often have you used the following technologies in your advising practice?"	NSSE Q. 1
3. My institution strongly emphasizes the use of the following technologies for academic advising:	EDUCAUSE/ECAR Q5a EDUCAUSE/ECAR Q8c.
4. During the academic year, how often have you used technology to communicate with the following people at your institution?	NSSE Q. 4
5. Please identify how frequently you use these technologies.	EDUCAUSE/ECAR Q3.
6. Technology in advising at my institution gives me access to resources for:	EDUCAUSE/ECAR Q16.
7. Technology in advising at my institution makes me more productive by:	EDUCAUSE/ECAR Q12
8. Technology in advising at my institution helps me feel connected in the following ways:	
9. What is your ideal technology in advising practice	EDUCAUSE/ECAR Q7

Appendix C:

Data comparing questions from the 2013 survey to similar questions on the 2002 and 2007 NACADA surveys regarding the use of different technologies in advising

Q1 = **2002 and 2007** In your advising role, which technologies do you use on a regular basis? (check all that apply**)**

Q = **2013** During the current school year, how often have you used the following technologies in your advising practice?

Q5 = **2013** Please identify how frequently you use these technologies

Technology	Rank/Mean 2013	2007%	2002%
e-mail (Eudora, Outlook, etc.)	Q 2, Rank 1, 1.02	2063 (97.73%)	795 (96.83%)
Web browser (Internet Explorer, Netscape, etc.)		1978 (93.7%)	745 (90.74%)
Spreadsheet software (Excel, Lotus 1-2-3, etc.)	Q 2, Rank 3, 1.41	1503 (71.2%)	420 (51.16%)
Word processing software (Word, WordPerfect, etc.)	Q 2, Rank 3, 1.41	1826 (86.5%)	727 (88.55%)
Presentation software (Freelance Graphics, PowerPoint, etc.)		1265 (59.92%)	371 (45.19%)
Database software (Access, FileMaker Pro, etc.)		839 (39.74%)	384 (46.77%)
Electronic calendar (Lotus Organizer, Outlook, etc.)		1560 (73.9%)	476 (57.98%)
Voice recognition software (NaturallySpeaking, ViaVoice, etc.)		25 (1.18%)	15 (1.83%)
Web page software (Dreamweaver, Fireworks, FrontPage, etc.)		437 (20.7%)	208 (25.33%)
Brochure/document editors (PageMaker, Publisher, etc.)		680 (32.21%)	239 (29.11%)
Graphics software (Illustrator, Paint Shop Pro, Photoshop, etc.)		201 (9.52%)	92 (11.21%)
Instant messaging (Instant Messenger, Netmeeting, ICQ, etc.)	Q 5, Rank 8, 3.52	460 (21.79%)	85 (10.35%)
Course management software (Blackboard, WebCT, etc.)	Q 5, Rank 6, 3.19	773 (36.62%)	169 (20.58%)
Handheld devices (Palm, Visor, etc.)		244 (11.56%)	109 (13.28%)
Assistive/adaptive devices (screen readers, Braille displays, alternative pointing devices, etc.)		24 (1.14%)	11 (1.34%)
Podcasts		68 (3.22%)	NA
Instant Messaging	Q 5, Rank 8, 3.52	259 (12.27%)	NA
Other:		240 (11.37%)	