Vision 2020:

Charting a Course for Academic Computing at Wake Forest

May 2015

PREFACE

In August 2013, the Information Technology Executive Committee (ITEC) commissioned the Vision 2020 task force to investigate the use of emerging technologies in support of teaching, learning, scholarly, and creative work at Wake Forest University. The task force, comprised of faculty, staff, administrators, and students, developed a report to be shared with the campus community suggesting the processes, characteristics and institutional structure needed in order to use technology effectively and responsibly in carrying out the university's mission of education and scholarship as we move toward 2020 and beyond. In May 2014, the task force presented a draft report to ITEC, which was shared with the campus community in October 2014 to solicit feedback. Two campus-wide open forums were held in the fall and a number of groups provided valuable written feedback, including the Department of History, the Committee on Information Technology, the Research Advisory Council, the Teaching and Learning Center Advisory Committee, and the Senate's Committee on Academic Freedom and Responsibility.

The Vision 2020 task force considered responses from all reporting groups. We present this revised document as our best attempt to look into the near-term future of educational technology and present opportunities for faculty, staff, and students to enhance the teaching, learning, scholarly, and creative work at Wake Forest.

Vision 2020 Task Force
May 26, 2015

INTRODUCTION

In 1995, Wake Forest University created the Plan for the Class of 2000, which included an ambitious computing initiative that would become the envy of colleges and universities worldwide. At that time it would have been difficult to imagine the changes in higher education that information technology would bring in the next two decades. The World Wide Web was in its infancy; laptop computers were uncommon. Mass adoption of smartphones, cloud computing, and a myriad of other technologies were many years in the future.

Technology has changed how we work, but our commitment to high quality education and scholarship is unchanged. The Plan for the Class of 2000 ushered in a period of unprecedented pedagogical innovation at Wake Forest. Faculty and administrators worked together to craft a structure that enabled the university to be more effective in its mission. Direct outcomes included a more robust network, software standardization, powerful hardware, academic technology support staff embedded in departments, and a formal faculty role in academic technology decision making.

While we continue to benefit from those innovations, there are many new opportunities ahead. The Vision 2020 task force recognizes the sea change that is occurring in the use of technology in teaching, emerging models of open access for scholarly work, and the benefits of cloud computing. We respond equally to the attendant technical and *non*technical imperatives. Specifically, we envision developing our instructional and social spaces to reflect new modes of working and collaborating.

In this report, we present:

- Vision 2020 values
- A brief environmental scan
- Our observations on teaching and learning; scholarship and creative work; and cloud-based computing
- Ten recommendations as a way to move forward

In some ways, the opportunity to employ academic technology-based advances is more daunting than it was in 1995. At that time, Wake Forest was able to achieve distinction by requiring a standard device for students, faculty and staff. Unlike two decades ago, the basis of distinction is not currently driven or enabled by a single computing device. Indeed, it is precisely the *absence* of standardized computing devices that characterizes our current environment. In a world replete

with low-cost bandwidth, ready access to exponentially expanding data repositories, and a generally technology- savvy populace, Wake Forest has the opportunity to pursue the promise of technology to empower, engage, and enable a wonderfully diverse array of individuals and organizations committed to teaching and learning in the spirit of *Pro Humanitate*. We envision a Wake Forest fully rooted in its values and mission as it moves confidently into a rapidly evolving educational and technical landscape.

VISION

Our vision is that Wake Forest remain an exemplar for a new kind of premier learning experience, valued not only for the close personal relationships between our students and their instructors, but also for the innovative learning environment afforded by our effective use of academic technology in our teaching, learning, scholarly, and creative pursuits. Our students, faculty, and staff will demonstrate the power of new modes of working, learning, collaborating, sharing, and contributing.

We understand the following values as vital to Wake Forest's identity as an institution:

- Wake Forest is personal. Irrespective of technology, we believe in the power of close personal relationships, especially between faculty and students.
- Wake Forest embraces experimentation and innovation. While we learn from the experiences of other institutions, we also explore uncharted territory, learning from our own successes and failures.

On the basis of these values, our task force encourages development of the following attributes:

- Agility: We recognize the importance of adaptation both in personal (student-teacher; scholar-scholar) relationships, and with respect to a rapidly changing technological environment that brings both promise and peril.
- Critical reflection: Rather than simply embracing change for its own sake, we seek a balanced consideration of *both* what works well in established methods of teaching, learning, and research, *and* how (or whether) these processes may benefit from technological supplements or enhancements.

We aim to be recognized as a leading example of how best to combine the merits of traditional liberal arts education with the power of technology, while also demonstrating prowess in the use of teaching and learning strategies that use technology in graduate and professional education.

ENVIRONMENTAL SCAN

Our first task was to determine what was already being done at Wake Forest and at other peer and aspirational institutions. These findings are summarized below by each sub-group and should be construed as **observations,** rather than recommendations.

Higher education is experiencing rapid growth in opportunities to use technology in the service of teaching, learning, research and creative expression. Students are learning and practicing digital skills at a young age. Teachers at Wake Forest and elsewhere are using technology to explore promising new methods of engaging our students both in the classroom and occasionally from remote locations. At the same time, higher education is also experiencing numerous challenges. Cost structures are driving tuition figures to levels that are drawing national attention and, increasingly, ire. Traditional colleges and universities are seeking new revenue streams by introducing an array of online offerings. Ironically, the same academic technology that represents opportunities for dramatically enhancing the higher education experience also presents one of its more formidable threats: purely online educational offerings that disrupt the traditional college or university model. MOOCs offered by prestigious higher educational institutions, fully online degree offerings offered by educational institutions of all types, and consortium-based online offerings limited to select participating institutions are but a few examples of the kinds of changes, which, taken together, could signal a reconfiguration of the higher education market.

Wake Forest's experience with Semester Online was an early glimpse of the kinds of rapid change that institutions of higher education are facing. Our students understand the shifting – and disappearing – boundaries in higher education and many of them are prepared to embrace the myriad of learning opportunities that involve technology. Today's undergraduate students have the ability to gain academic credit from technological sources outside Wake Forest. They may use Khan Academy, MOOCs and YouTube to augment the courses in which they currently are enrolled at Wake Forest. Our graduate and professional programs also follow these trends. Our graduate counseling program represents an early foray into online delivery at Wake Forest. Regardless of program, faculty members and students alike use cloud-based apps for personal productivity, and remix and reuse content in new and innovative ways for which we - and academia more broadly - may be ill prepared. Without question, outside forces are re-contextualizing the Wake Forest experience.

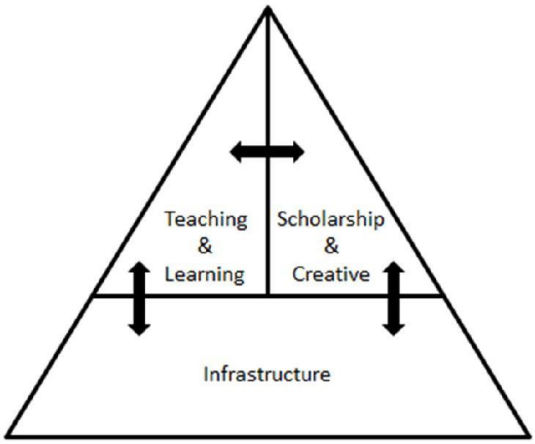
Ironically, the primary and secondary educational experiences of many of our students may have been more technologically advanced than their current Wake Forest experience. K-12 has been a launching pad for the development of effective teaching strategies using technology. Many K-12 teachers are trained in teaching and learning theory to a far greater extent than most terminally qualified college and university professors. Outside of the classroom, students are employing modern web-based tools and apps to support personal productivity and collaboration with peers.

As with instructional activity, scholarship and creative productivity are also experiencing the effects of rapidly evolving technology. Open access publishing[1] presents both opportunities and challenges for higher education. The impact of scholarly and creative output increases with its accessibility. However, prevailing approaches to vetting, storing, and making available the products of scholarly and creative activity often serve to limit rather than expand audiences for this work.

The teacher-scholar model at the heart of Wake Forest requires the successful pursuit of scholarly and creative goals at high levels of quality. Our *Pro Humanitate* ideal invites our faculty and students to share their work within and beyond the academic community, advancing research in specific fields and potentially contributing to practice. The application of academic technology solutions – some of which are only beginning to emerge –may amplify both the visibility and impact of our scholarly and creative activity at Wake Forest. In many fields, open access encourages the engagement of scholars with a variety of audiences that they would not otherwise reach.

As technology enables the rapid evolution of the teaching and learning experience, as well as the scholarly and creative activities of our faculty and students, it also presents interesting questions regarding the infrastructure models that underlay these activities. Inasmuch as our infrastructure decisions have a long-term effect on our ability to excel in our instructional, scholarly, and creative pursuits, these decisions are no less critical than investments aimed at nearer-term instructional and scholarly activities. With the advent of cloud-based computing, many technology services historically developed and managed in-house are now more cost-effectively supported by external partners. Lower costs, greater support for collaboration, device independence, enhanced reliability, and flexibility of use - all features that are vital in an academic environment – often are realized by the institution and its students, faculty and staff. At the same time, cloud-based computing is still maturing as a technology. Important questions will need to be addressed, in particular security and privacy. Moving these questions forward is of utmost importance.

[1] Open access has been defined by SPARC (Scholarly Publishing and Academic Resources Coalition) as the free, immediate, online availability of research articles, coupled with the rights to use these articles fully in the digital environment.



Pictured is our simplifying framework for contemplating the road ahead for the role of technology in the academic life of our institution (Figure 1): Through our learner-centered focus, we enhance both the learning *experience* and *outcomes* for our students, which is the heart of our mission as a university. Through our emphasis on scholarship and creative activity, we advance bodies of knowledge in service to the greater good. Our long-term success demands that we recognize the profound impact of our infrastructure enhancements, as it is those decisions that not only enable our near term aspirations, but often have the longest lasting impact on our options moving forward.[2] In the balance of this report, we organize our observations, conclusions and recommendations within this simplifying framework.

TEACHING AND LEARNING OBSERVATIONS

Nearly two decades ago, academicians took their first tentative steps into a mode of teaching that would become known as the "flipped classroom." Almost simultaneously, technology vendors brought the learning management system, or "LMS," into the marketplace. Sakai is the LMS currently used at Wake Forest. Networked educational simulation tools, collaboration tools and online assessment tools would soon follow. Some were destined to have limited impact (Second Life, for example), while others, such as LMS, would evolve into ever more powerful assets. Meanwhile, new collaboration solutions such as Google Apps and WebEx emerged onto the higher education landscape, bringing promise but little clarity regarding how best to employ these new resources in educational settings. All the while, the cost of computing power has moved ever downward, yielding the emergence of vast data and information repositories together with abundant affordable bandwidth. The past twenty years has seen a flourishing of technology products aimed at the higher education industry, together with a vibrant community of educators,

[2] In this document, we define infrastructure broadly to include not only information technology, but also the built environment (e.g. instructional spaces, instructional design resources, and professional development resources).

staff members and students eager to explore their potential. Taken together, this evolution has transformed campus practices and is re-contextualizing higher education.

Given the withering pace of new technology development and deployment, it is challenging to peer very far into the future with regard to technological capabilities and the effect those capabilities may have on the life of educational institutions. In many respects, the effects will simply mirror those seen in society more broadly. Our norms of communication and collaboration, for example, will be set not singularly in higher education, but rather across a broad array of industrial, social, and political contexts. In other ways, however, technology can be expected to uniquely impact education.

As we contemplate the trajectory of our university as it relates to the leveraging of academic technology, it is tempting to advocate for the active exploration, or perhaps even deployment, of specific technology solutions. If, for example, flipped classrooms are in vogue, it would be easy to assume that we must hurry to systematize our use of the flipped classroom concept. We avoid such temptations herein, believing that far more important to the preservation and furtherance of our learning community is the establishment of a durable model that allows us to identify, explore, deploy, and evaluate relevant technologies *over time* as we approach 2020. We seek to avoid episodic forays into teaching and learning strategies that use technology, in which our interest and enthusiasm will inevitably wax and wane over time. We believe that a well-considered sustained engagement with the effects of academic technology on teaching and learning is imperative.

We envision an education resource ecosystem characterized by *continuous inquiry* into the merits and demerits of technology solutions. The establishment of this ecosystem depends not only on the identification of currently popular teaching and learning strategies that use technology, but also of longer-term trends that likely will drive higher education in the years leading to 2020:

Trends

1. **Shifting role of the instructor.** The most often heard observation in our research was that the role of the instructor is changing in enduring ways. Personalized adaptive learning will become more prominent. The resulting learning ecosystems rely on instructors not only as subject matter experts, but increasingly as curators and facilitators. The very notion of authoritative knowledge will be challenged by students. Data and information will not channel solely through instructors – a trend already evident. The role of instructor may involve designing and facilitating interactions with content that are

learner-centered. It will become common to engage with subject matter experts, practitioners, and students beyond the boundaries of the course and, indeed, home institution. Such an environment has been referred to as "mobilizing networks" that "stress flexibility, interactivity, and outcome."[3] Too, although MOOC utilization continues to be slow in most traditional educational settings[4], positive results have been achieved when integrating MOOCs into traditional course environments.[5] Simultaneously, a surge of interest in competency-based assessment has appeared. An exploding array of assessment methods and alternatives to traditional higher education are calling into question the value and relevance of the credit hour as a credential. E-portfolios, for example, allow students to compile web-based collections of evidence to demonstrate learning to potential employers or graduate schools. The concept of digital badges, an emerging method of indicating competence or accomplishment, allows students to "collect" learning credentials from disparate learning environments. Badges are one means among many of signifying achievement of learning objectives. A variety of forces and trends portend a dramatic shift in pedagogies and assessment strategies. This dramatic change demands a set of skills and abilities unfamiliar to many instructors.

2. **Emergence of "Anywhere Learning."** Related to the evolving role of the instructor, significant opportunities will emerge to leverage boundary-less learning ecologies in which students are engaged with content and collaborators anytime, anywhere. So-called "second screen" strategies have been developed by instructors recognizing the power of laptop, tablet and mobile devices in classroom settings where public screens also are in use.[6] Certainly, contemporary students expect access to data and information in ways previously unseen, particularly with regard to ease and immediacy of access.[7] No longer are the classroom and library the primary points of knowledge delivery. On the contrary, technology carries the promise of a more persistent learning experience, one characterized by a variety of learning activities occurring throughout the course of students' daily lives. It has been suggested that a "growing appreciation for the porous boundaries between the classroom and life experience, along with the power of social learning, authentic audiences, and integrative contexts, has created not only promising changes in learning but also disruptive moments in teaching."[8] This does not suggest the

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[3] Cathy Davidson and David Theo Goldberg. "The Future of Learning Institutions in a Digital Age" (Cambridge, MA: MIT Press, 2009), p.34.
http://mitpress.mit.edu/sites/default/files/titles/free_download/9780262513593_Future_of_Learning.pdf

[4] Eden Dahlstrom, J.D. Walker and Charles Dziuban. *ECAR Study of Undergraduate Students and Information Technology, 2013* (Research Report). Louisville, CO: EDUCAUSE Center for Applied Research, September 2013. http://www.educause.edu/ecar

[5] Jennifer Sparrow. Virginia Polytechnic University. Personal Interview. 1 Dec. 2013.

[6] Lance Ford. Cisco. Personal Interview. 22 Nov. 2013.

[7] Jennifer Sparrow. Virginia Polytechnic University. Personal Interview. 19 Nov. 2013.

[8] Randy Bass, "Disrupting Ourselves: The Problem of Learning in Higher Education" *EDUCAUSE Review Online*, March/April 2012. http://www.educause.edu/ero/article/disrupting-ourselves-problem-learning-higher-education

end of traditional classroom and course experiences, but rather a distinct movement away from the centrality of those experiences in learning. Here again, emergent trends point to new and evolving pedagogies.

3. **Migration to BYOD.** The shift to "bring your own device" or "BYOD" computing environments continues apace. Not only are multiple operating systems the norm, but so too are multiple form factors. Not restricted to the higher education space, BYOD is a significant trend more broadly, manifesting across and social and work landscapes. There even is evidence to suggest that recent graduates apply a BYOD filter when considering employment opportunities.[9] As of 2012, 62% of undergraduate students owned a smartphone, while 15% owned a tablet device; the average number of devices per student was 2.4.[10] Each device fulfills a distinct need in the academic and social milieu of a student. The aggregate of a student's previous personal and academic technology experience creates vested interests in those devices and platforms that are not easily displaced. Early efforts at wearable computing devices such as Google Glass and smart watches are a natural evolution of computing device trends, hinting at yet unimagined opportunities and impacts. At the same time, content providers recognize the proliferation of computing options and accordingly are evolving to embrace most major computing platforms and devices. It simply is no longer feasible to provide a differentiated – or perhaps even state-of-the-shelf – learning experience through requiring uniform device or platform adoption.

4. **Evolving student preferences.** Much has been said about generational learning styles among our students (especially undergraduates). We recognize several trends, reported by the EDUCAUSE Center for Applied Research, that are relevant to academic technology resources' development in the coming few years:[11]
    - Students prefer learning ecologies that combine face-to-face and online elements;
    - Students are keenly interested in pedagogies that leverage personal mobile devices;
    - Use of social media generally is *not* a preferred communication medium for course-related activity;
    - There is increasing demand for utilization of the LMS;

[9] Michael Endler, "4 Big BYOD Trends for 2013," InformationWeek. 20 Feb. 2013. http://www.informationweek.com/mobile/mobile-devices/4-big-byod-trends-for-2013/d/d-id/1108743?

[10] Eden Dahlstrom and Stephen diFilipo. *The Consumerization of Technology and Bring-Your-Own-Everything (BYOE) Era of Higher Education* (Research Report). Louisville, CO: EDUCAUSE Center for Applied Research, 25 Mar. 2013. http://www.educause.edu/ecar

[11] Eden Dahlstrom, J.D. Walker and Charles Dziuban. *ECAR Study of Undergraduate Students and Information Technology, 2013* (Research Report). Louisville, CO: EDUCAUSE Center for Applied Research, September 2013. http://www.educause.edu/ecar

- More progressive education resources such as e-texts and e-portfolios have yet to achieve traction with students, resulting in ambivalence to date

Taken together, we discern a faculty and undergraduate student population that generally is receptive to, but under-informed about, recent developments and pedagogical effects of academic technology. Incremental rather than wholesale change in the underlying principles of the educational experience appears warranted.

Graduate and professional education generally is ahead of undergraduate settings with regard to deployment of technology in the teaching and learning process, whether in blended or fully online settings. The needs of these student populations are generally well understood and quite distinct from those of undergraduate students.

5. **Collaboration is key.** Collaboration already is a significant attribute of the higher education landscape, with its prominence and importance likely to increase. Our students come to us with increasingly networked lives, made possible in large measure by the ever-growing array of vendor solutions aimed at supporting communication and collaboration. We also see vigorous discussion in the academy regarding collaboration as a major thrust in pedagogical evolution. For their part, recruiters consistently highlight their need for new talent that is capable of working in dynamic team-based environments,[12] many of which are virtual.

6. **Development of alternative course material platforms.** As is widely recognized, traditional print textbooks are both expensive and unable to deliver rich content. From audio and video content, to collaborative and discussion group spaces, to interactive learning experiences, new media are on the cusp of revolutionizing learning materials. The dominance of the printed text may soon give way to less expensive and more impactful media. While many of these technologies are in their infancy, early products are encouraging, with rapid evolution expected. Such innovative resources are relatively difficult and expensive to create and maintain, however, and will not be appropriate to every discipline, course or instructor.[13] Too, the publishing industry has yet to develop scalable models for such products. In the meantime, several authors within Wake Forest are pursuing, to varying extents, the creation of such resources. Whether outsourced, insourced, or some combination thereof, the role of these rich media resources is expected only to increase.

[12] National Leadership Council for Liberal Education & America's Promise. *College Learning for the New Global Century*. Washington, DC: Association of American Colleges and Universities, 2007. http://www.aacu.org/leap/documents/GlobalCentury_final.pdf

[13] Comparative scholarly analyses of print and e-textbooks are increasing; one thoughtful account is David B. Daniel and William Douglas Woody, "E-textbooks at what cost? Performance and use of electronic v. print texts," *Computers & Education* 62:1 (2013), 18-23.

7. **Emergence of learning analytics.** Defined as the "measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs,"[14] learning analytics appears poised to transform the design and delivery of educational experiences. Both students and instructors can gain important insights into how their engagement with the teaching and learning process affects learning outcomes.[15] Providing students with aggregate data on the behaviors (e.g., LMS usage) and performance of their peers, as compared to their own learning practices, can be highly motivating. Instructors may elect to identify at-risk students and subsequently engage in personalized responses tailored to the needs of those students.[16] The path toward robust learning analytics is one littered with questions concerning privacy, change management, data stewardship and other issues. While important, these issues are solvable and, indeed, are topics of vigorous conversation currently within the academy, where—not least to satisfy accreditation requirements—the trend toward more significant reliance on learning analytics appears certain.

Finally, during our research, connectivism emerged again and again as a potent model for learning. This well-recognized (if not widely employed) concept holds that "knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks."[17] Connectivism has been heralded as "the learning theory for the digital age,"[18] as it explicitly considers the role of technology, individuals, organizations, and networks in learning. Indeed, it seems that the aforementioned trends have progressed to a sufficient degree to enable an empirically-informed pursuit of the principles of connectivism, and ultimately to gauge its impact. Connectivism is not new, but our ability to more effectively capture its full potential is dramatically improved through the power of technology and the pedagogies it enables. It may be that connectivism can serve as a unifying construct for any change initiative we elect to pursue at the intersection of teaching, learning, and technology.

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[14] Phil Long and George Seimens, "Penetrating the Fog," *EDUCAUSE Review Online*, September/October 2011. https://net.educause.edu/ir/library/pdf/ERM1151.pdf

[15] Veronica Diaz and Shelli Fowler. "Leadership and Learning Analytics" EDUCAUSE Learning Initiative, 2012. https://net.educause.edu/ir/library/pdf/ELIB1205.pdf

[16] Diaz and Fowler, 2012.

[17] Stephen Downes, "What Connectivism Is," Weblog entry. 3 Feb. 2007. http://halfanhour.blogspot.co.uk/2007/02/what-connectivism-is.html Accessed 15 April 2014.

[18] James Walker, "Connectivism - a new learning theory," Weblog entry. 30 Jun. 2013. http://mnli.org/2013/06/connectivism-a-new-learning-theory/

SCHOLARSHIP AND CREATIVE PRODUCTION OBSERVATIONS

The potential of technology to usefully augment scholarship and creative production in colleges and universities is significant. Refinement of the processes associated with scholarship and creative production, as well as the democratization of access to their results, promises to continue enhancing this vital aspect of academic life. A distillation of the national and international dialogue suggests two primary trends.

1. **Shift to open-access scholarship.** The term "open access" first appeared in 2001 as part of Budapest Open Access Initiative, which began in Budapest, Hungary. This was followed by the Berlin Declaration in 2003, to which Wake Forest became a signatory in 2012.[19] Open access is expected to have a strong positive impact "on the construction of research questions and methodologies, on the design and conduct of experiments, and on the communication and, ultimately, the use of research by various stakeholders."[20] This aligns strongly with the commitment of Wake Forest to have positive impacts on society locally, nationally, and globally. Simultaneously, open access can elevate the visibility and, by direct extension, reputation of our university. Open access aligns strongly with our *Pro Humanitate* ideal. We expect the significant majority of reputable institutions will continue to move in the direction of open access, removing barriers to collaboration between scholars, dramatically broadening the consumption of scholarly output, and invigorating new lines of scholarly inquiry.

2. **Shift to comprehensive institutional repositories and the archiving of data and scholarship.** Global production of data and information products is increasing exponentially. Colleges and universities are significant contributors to an ever growing body of knowledge across a wide array of fields and disciplines. More importantly, the *diversity* of work product types emanating from institutions of higher learning is similarly growing, no longer limited to traditional publication, patents and the like. The realization of the full potential of open access scholarship and creative production depends locally on the establishment of comprehensive institutional repositories of scholarly work, as well as archives of data with potential and proven scholarly value. Such repositories hold the promise of dramatically increasing the efficiency with which other scholars access and springboard from existing resources, avoiding the substantial direct and indirect search costs commonly borne by scholars today.

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[19] Crafted in October 2003, the Berlin Declaration was intended "to promote the Internet as a functional instrument for a global scientific knowledge base and human reflection and to specify measures which research policy makers, research institutions, funding agencies, libraries, archives and museums need to consider." http://openaccess.mpg.de/286432/Berlin-Declaration Accessed 10 May 2014.

[20] Heather Joseph, "The impact of open access on research and scholarship," C&RL News, February 2012, p.83-87. http://crln.acrl.org/content/73/2/83.full

The notion of academic research and creative production generating work products protected behind paywalls, only to be utilized by those with requisite financial resources is rapidly becoming an anachronism. For too long the audience for – and impact of – our scholarly and creative pursuits has been far too constrained. Through technology, we have the potential to effect a welcome discontinuity in the way our scholarly and creative outputs impact the world of which we are a part.

CAMPUS COMPUTING OBSERVATIONS

It generally is recognized that information technology infrastructure investments offer a more indirect and longer lasting impact in terms of value benefits. Determining value – especially *financial* value – often is exceedingly difficult, as the benefits of these assets accrue to different parts of the organization in different and uneven ways.[21] These infrastructure investments can nonetheless be essential enablers to other academic technology strategies. The value of many of the academic technology-based innovations currently emerging and projected to emerge in the higher education landscape in the near future almost certainly will depend upon two key trends:

1. **Shift from local to cloud computing.** Computing, and its accompanying infrastructure, effectively has become a utility resource in modern university settings. Not surprisingly, these technology assets often now are viewed as cost centers rather than strategic resources. Against this backdrop, our research indicates that for both our peers and our corporate partners, the near-term future will be characterized by a significant degree of publicly managed cloud computing. Cloud computing, broadly defined, is the deployment over a network of computing resources that traditionally have been available on a local computing device. Arguments for cloud computing include scalability of resources, device independence, support for collaboration, and environmental and cost efficiency.

2. **Migration to BYOD.** The shift to Bring-Your-Own-Device computing environments has implications for the teaching and learning environment, as well as the infrastructure investments on which those experiences depend.[22] BYOD computing, while responsive to societal and industry trends, presents a more complex support environment for organizations. While cloud-based computing heralds the promise of true device-independence with regard to software applications, the additional challenges associated with providing support likely will require consideration of various levels of service and the costs associated with these service levels.

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[21] Acer Maamoun, "The Business of IT: Calculating the Value of IT Infrastructure in Government," TechNet Magazine, October 2007. http://technet.microsoft.com/en-us/magazine/2007.10.businessofit.aspx

[22] Eden Dahlstrom and Stephen diFilipo. *The Consumerization of Technology and Bring-Your-Own-Everything (BYOE) Era of Higher Education* (Research Report). Louisville, CO: EDUCAUSE Center for Applied Research, 25 Mar. 2013. http://www.educause.edu/ecar

3. **Ever-important accessibility concerns.** As we evaluated the legal environment around technology, we were reminded of Sections 504 and 508 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, and the Americans with Disabilities Act Amendments of 2008 which prohibit discrimination against individuals with disabilities. These laws mean that our physical and virtual spaces should be accessible to all students, as well as faculty and staff, both those with disabilities and those without. Best practice, however, involves the use of the concept of **universal design** (often **inclusive design**), which refers to broad-spectrum ideas meant to produce buildings, products and environments, physical and virtual, that are inherently accessible to all people; older people, people without disabilities, and people with disabilities.

The impact of technology infrastructure decisions made today will affect our institution for years to come. Our ability to realize the vision set forth earlier in this white paper depends upon making infrastructure decisions that not only enable our near-term aspirations, but also that afford the flexibility required to meet new opportunities as they arise.

THE WAY FORWARD (RECOMMENDATIONS)

The role of information technology in higher education is broadening and deepening. Our ability as an institution to achieve well-considered responses to new technology will depend fundamentally upon the concerted efforts of an array of individuals and teams at Wake Forest. We recommend a set of actions and commitments toward that end, while emphasizing the need to carefully *align* these efforts. The technology imperatives facing our institution do not exist in a vacuum, but instead touch a myriad of other dimensions of the institution.

Recommendations regarding teaching and learning

At Wake Forest, we are privileged to have among our ranks some of the finest and most innovative teacher-scholars in the country. We thrive in an environment of small classes, close student-faculty relationships, and encouragement for experimentation and innovation in teaching and learning. These features are at the very core of what makes Wake Forest a special place. As we look to the future, just as we enthusiastically support traditional teaching methods proven effective over decades, we also want to ensure that Wake Forest continues to nurture *emerging* methods that are student-centered, evidence-based, and genuinely beneficial supplements to teaching and learning. We need look no further than recent Wake Forest teaching innovations such as the "gamification" of a Latin grammar course by one of our colleagues in the Classics Department to know that effective, student-centered methods need not rely in any way on digital technology. That said (and as a committee charged with looking specifically at digital

technology), promising novel technologies and the shifting teaching and learning landscape compel us to look closely at how we might nurture, enable, and equip the Wake Forest teacher-scholars of the future.

Evolving methods of content delivery and student engagement that integrate technology create possibilities for innovative new uses of our highly valued face-to-face class time and physical space. Faculty members teaching in flipped classrooms deliver content in a variety of modalities before using class time for authentic, active learning. Fully online courses, when designed using pedagogically sound practices, have demonstrated learning outcomes equal to those achieved in face-to-face settings in some instances.[23] As is the case with any technology, academic technology can be expected to become more affordable and easier to use over time. We are already witnessing the significant shift in higher education brought by these recent improvements. Attendant with these new teaching strategies is a whole range of needs, both old and new. Designing courses around clearly identified learning objectives characterizes the work of many of our teacher-scholars, and is well supported. Producing interactive web-based learning tools, digital repositories for student work, or rich multimedia--needs common to these new teaching strategies--are perhaps less easily accomplished by individual faculty. It is no longer a question of *whether* an interested Wake Forest professor can choose to explore technology-enhanced teaching strategies, it is now a question of *how well their efforts will be supported*.

As technology-enhanced teaching strategies have evolved rapidly in recent years, so too has consideration of how the built environment can enable and amplify the benefits of those strategies. A wide array of new classroom designs offers real pedagogical flexibility. Leading edge classroom infrastructure (including technology, furnishings, and supporting tools) offer the opportunity to reconfigure classroom settings "on the fly," thereby allowing rapid shifts between pedagogical techniques during class sessions. Students can move between individual, team and whole-class activities seamlessly. As we prepare for the future of teaching and learning at Wake Forest, we must not ignore how the decisions made in changing our physical learning environments will affect how teachers teach and how students learn.

The impressive rate of change in both space-enabled and technology-enhanced teaching and learning strategies already manifest in education suggests several opportunities for our academic community at Wake Forest.

> **Recommendation 1: Align our resources.** Wake Forest teacher-scholars benefit greatly from both teaching resources, such as the Teaching and Learning Center (TLC), and technology resources, such as the Instructional Technology Group (ITG) in the College.

[23] Means, Barbara et al. *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies*. US Department of Education, 2009. *ERIC*. Web. 5 Dec. 2013.

While these resources are able to meet many of the needs of faculty, others are often unaware of the breadth of services that exist across the university, and in some cases, services remain inaccessible to the whole community. We envision increased opportunity for collaboration, increased access to resources to support teaching, research, scholarship and creative activities, and improved emphasis on the teaching and learning effectiveness of instructional technologies. To accomplish this, we recommend the consideration of a Center for Excellence in Teaching and Learning[24] that aligns these extant resources under the common mission of supporting exceptional teaching. The Center would provide faculty one-stop access to teaching, instructional technology, and multimedia support, and would convene thoughtful campus-wide discussions of the issues at the intersections of teaching, learning, and technology. Rather than a center for instructional technology that exists outside the broader discussion of excellence in teaching, we see this center as being driven by the primacy of teaching.

The Center is envisioned as including such groups as the current Teaching and Learning Center (TLC), the Office of Online Education, the Instructional Technology Group, Digital Publishing, relevant staff in the Z. Smith Reynolds Library, and relevant resources from Information Systems.[25] Charged with providing instructional design services, faculty development, instructional technology training, and aligning pedagogical activity with physical and technological infrastructure, the Center would house resources not yet present in the Wake Forest portfolio. As envisioned, the Center would be capable of supporting a faculty member through the entire course development process, including ideation, design, development, technology, training, media production, and learning outcome assessment activities. Such a center has the potential to ignite enthusiasm and provide the appropriate support for teaching and learning at Wake Forest. Center staff members would be active advocates for excellence in teaching and learning in all its forms, including, but certainly not limited to, those supported by technology.

Recommendation 2: Focus our efforts. In order to develop a common understanding of and appreciation for proven instructional strategies within our teaching and learning community, we recommend coordinating the intensive faculty development programming already underway in the TLC with programming on instructional technologies that are effective at improving learning. Recent examples of TLC topics include reflective learning supported by e-portfolios, and deeper student engagement with in-class content, for example via clickers. Faculty should be provided with critical information on the relative strengths and weaknesses of various tools, the characteristics of situations in which they may be helpful, and still

[24] "The Center for Excellence in Teaching and Learning" is used throughout the balance of this document, but should be considered a placeholder name.

[25] As a matter of practicality, it is recognized that some resources may have a "dotted line" or matrix relationship with this center (e.g. specialized members of the library and Information Systems).

include other effective traditional instructional strategies. The faculty member could then determine which method, strategy, or combination will best work for him/her, given his/her curriculum, learning goals and students. For example, a workshop or training with a focus on flipped classrooms must include assistance in figuring out what content should move out of the classroom, whether or not any technology is required to do that, and to determine which activities will replace it during class time. While the Teaching and Learning Center staff can help with these tasks, there is also a need for instructional technology staff who can help a faculty member identify a technology that is most appropriate to support the out of class activities and avoid gratuitous use of instructional technology. Through a coordinated Center, we can make sure our investments of both time and money in instructional technology are guided first by pedagogy and proven effectiveness, and that any technology used is in full support of our educational mission.

Recommendation 3: Commit to effective and accessible learning spaces. We encourage the exploration and development of collaborative environments and learning spaces that include computing in order to support shared experiences. Well-designed active learning spaces can serve as centers for creative thinking, study, and other gatherings. There are some existing spaces on campus, such as the Z. Smith Reynolds Library Starbucks and Farrell Hall living room, which already reflect the desire of our students, faculty, and staff to gather for individual or collaborative work. We are just beginning to make significant investments in more advanced instructional spaces, however. Learning theorists and space designers are recognizing the beneficial interplay between space and technology, with new evidence-based space and furnishings designs emerging at an impressive rate.[26] Just as we commit to learner-centered *physical* spaces, so too should we commit to effective and learner-centered *digital* learning spaces, such as the university's learning management system (LMS). We believe that the full potential of technology to positively impact teaching and learning is realized only when considered in concert with the spaces within which we teach, learn, and interact.

Recommendations regarding research and creative production

Faculty scholarship and creative production disseminated through traditional channels like peer-reviewed academic journals, remains central to academic practice. Compared to only a decade ago, a more extensive array of venues is available to scholars seeking to make their work more broadly accessible. Tenure and promotion decisions will still put greatest emphasis on peer-reviewed work in published discipline-specific formats, such as articles in traditional journals and university press monographs, when gauging the quality of faculty productivity. But a broader conception of research and creative production may increase both the visibility and the impact of the scholarly work of our faculty.

[26] Painter, Susan et al. *Research on Learning Space Design: Present State, Future Directions*. Society for College and University Planning, 2013. Web. 14 Jan. 2015.

Recommendation 4: Support the Open Access Movement. The open access ideal encourages scholars to engage with a variety of audiences in order to facilitate the spread of important ideas. Norms for open access vary greatly by discipline. In some fields, it is prevalent and respected; in others, it is currently impractical. Increasingly, scholarship in both new and traditional academic journals can be made freely available to a worldwide community via the Internet. We encourage Wake Forest to join the open access movement that is taking hold within many disciplines at a multitude of leading academic institutions. Participation will allow us to gain insight into the relative benefits of wider visibility through free access to scholarship.

Where available in their discipline, faculty members are encouraged to negotiate less restrictive publishing agreements that allow them to re-purpose and re-publish those works in other venues, including our own institutional repository (see below) and on the web. Participation in the open access movement is not a mandate limiting faculty from choosing where to publish scholarly works. Faculty are encouraged, however, to consider that requesting of rights prior to publication can lead to their controlling the future dissemination of their work. As one example, library faculty members of the Z. Smith Reynolds Library unanimously adopted an open access policy on February 1, 2010, to achieve the widest possible access to and long-term preservation of their scholarly works. Each library faculty member grants Wake Forest the right to archive and make publicly available the full text of the author's final version of scholarly works via the University's open access institutional repository. This provides the University a non-exclusive, worldwide, irrevocable, royalty-free license to preserve and redistribute the work. When publisher agreements do not automatically grant permission to archive the author's final version, library faculty commit to negotiating for such rights. Furthermore, library faculty members endeavor to publish their scholarship in open access venues whenever possible.

Recommendation 5: Develop a robust Wake Forest electronic repository. We believe that Wake Forest will benefit by preserving all manner of works developed by our faculty colleagues, thereby creating a valuable record of the intellectual work of our university. We have already made significant strides with the establishment of our institutional repository "WakeSpace." We encourage growth of WakeSpace by increasing the volume of works deposited, thereby encouraging faculty in all academic units, as well as master's and doctoral students, to consider the benefits of open access to their scholarship. The potential of the repository to contribute to the academy and beyond while also enhancing the reputation of Wake Forest is tied directly to the participation of faculty members and graduate students across the university.

Recommendations regarding technology infrastructure and cloud-based computing

Emerging as a major technology trend several years ago, cloud computing will continue to have a significant impact on organizational computing in the foreseeable future. The concept of cloud computing continues to evolve, with private and hybrid cloud models now extant. Migration to cloud-based computing, when and where appropriate, can be complex, as basic assumptions of extant technology investments may no longer be appropriate. Still, cloud computing is not a fleeting fad; higher education stands to benefit tremendously from cloud computing initiatives rooted in thoughtful planning and meaningful collaborations with our education and industry partners.

Recommendation 6: Commit to the cloud. We appreciate the initiative of Information Systems in early university-wide adoption of cloud-based services such as Google Apps for Education, WebEx, and pilot-testing cloud backup solutions. We recommend that Information Systems continue to develop the skill sets needed to fully embrace the power of cloud applications and that they commit to significantly increased cloud computing in our academic community, particularly with respect to applications with an expectation of anywhere/anytime use, such as learning management and file sharing.[27]

Recommendation 7: Become device-agnostic. Even as our university evolves in its requirement for a standard issue laptop and software load, we must be responsive to growing evidence that campus populations will employ a myriad of computing devices. The resulting collection of devices, platforms and form factors enable compelling new modes of interaction, which we should encourage and support. However, it generally will be cost prohibitive to create or acquire device-specific solutions across a broad array of devices, pointing to the need to marry our device and cloud-based strategies, each informing the other. Most fundamentally, we recommend the aggressive pursuit of efforts aimed at making the software resources required to actively participate in the life of our campus (including academic services such as WIN, as well as commonly employed software) device-agnostic.

We recognize that cloud based solutions are not yet available and/or satisfactory for every academic need. Tablets and smartphones perform well for content consumption, but effective creation and collaboration often require the processing power and screen sizes that are still found only in laptops and desktops. Therefore, we recommend all students be provided or required to purchase laptops and software of sufficient power and utility to meet their academic needs.

[27] There is clear need to carefully delineate those data and information assets that can be legally moved off-campus. Although the use of third-parties to support computing raises security concerns, it is important to recognize the extent to which security concerns exist even when data are stored locally by the University.

In the university's 2012 *Next Steps* report, the Committee on Information Technology concluded that the mandating of a single laptop model is no longer warranted by academic need. We further recommend that the University develop mechanisms to support students and faculty member choice between a Windows or Apple laptop that meets their academic needs. In the event the university moves to a student-owned funding model, we recommend that students demonstrating financial need be provided a laptop adequate for their academic needs. The success of such a model, in place at other institutions, relies on facilitating students' purchase of laptop models that match University recommendations. CIT noted in *Next Steps* that while mandating a single operating system is no longer justified by academic considerations, collaboration is best supported by software that is compatible across platforms. We must therefore continually evaluate cloud applications, as they will increasingly be the most cost-effective and device-agnostic solutions. For those applications requiring a laptop, the university should strive to deploy applications demonstrating strong cross-platform functionality.

The technology changes stemming from these recommendations will require a review of current campus computer security policies. It is important to ensure that cloud-based and device-agnostic computing models are not overly constrained. Priority issues to be evaluated include increased support for BYOD and guest devices on the campus network and for significant sharing (outflow and inflow) of data across network boundaries.

Recommendation 8: Keep the network strong. We believe it is important to underscore the continued centrality of highly reliable and adequate network connectivity. Cloud computing, device independence, technology-based collaboration, rich media learning resources, and the rise of big-data driven research all demand high quality, high bandwidth, and transparent network connectivity. Such connectivity needs to be scalable to a larger number of devices and to support the significantly larger traffic volumes resulting from the increased use of network applications. Understanding that high quality network connectivity will be an assumption of all populations when active on campus is critical to success. Resources committed to ensuring connectivity should be focused on-campus, with modest expectations for institutional support for off-campus connectivity.[28]

Recommendations toward sustainable success

The preceding recommendations can be *initiated* relatively quickly and with little or no disruption to our daily activities as an academic community. The ability to *sustain* the benefits

[28] There has been informal discussion on our campus regarding the potential of purely network-resident productivity suite. While we are intrigued by the potential of these solutions, we assert that software used by significant portions of all populations and fundamental to the successful work of all populations (such as word processing tools) should be supported in local (non-network) modes.

from these initiatives depends upon deeper change, however. The absorptive capacity of our community likely is insufficient to maintain new ways of doing and new ways of thinking about our most fundamental activities absent an intentional effort to collectively and collaboratively develop *not* as a loose collection of individuals, but rather as a cohesive whole committed to a common vision.

Recommendation 9: Be evidence-based and accessibility-focused. As we assert our commitment to capturing the value at the intersections between teaching, learning, scholarship, and technology, significant decisions regarding the allocation of our resources and the setting of priorities related to the above recommendations should be evidence-based. We must hold ourselves accountable to understand the real and potential impact of these decisions, requiring that we establish mechanisms to gather and analyze data that will drive assessment. As we embrace the value of experimentation in our academic community, it will be vitally important to accurately differentiate between those investments that work and those that do not.

For the benefit of all Wake Forest community members now and in the future, we also need to formalize the consideration of accessibility issues in the processes we use to make decisions about the design of learning spaces and our investments in software, hardware, and services to support the use of technology in our academic endeavors. To ensure that adopted systems employ accessible design, we must all have awareness and education enabling us to ask vendors if they provide accessibility features (e.g., captioned video, compatibility with assistive technology, etc.) for the computers, software, and services they are selling, and to interpret the answers. We must ensure that staff members and faculty are aware of accessibility options and that systems are in place to make accommodations. That said, accessibility of academic technology is only a part of the issue of digital accessibility of all campus resources including administrative services, external communication, public and internal websites, student support resources, etc. For this reason, we encourage the Provost's Office to convene a committee on digital accessibility to address these issues comprehensively.

Recommendation 10: Stand by our commitment. Achievement of the vision articulated earlier will require ongoing and consistent effort. It is useful to remind ourselves of our commitment and reward our progress in visible and meaningful ways. Such efforts communicate the value placed on our journey of continuous improvement. We recognize that not every faculty member either wants to or should incorporate technology in their scholarly or teaching pursuits. However, we believe the university should support those who choose to do so to improve their scholarship or improve student outcomes. The time and effort they put into these endeavors should be recognized and valued. This can be accomplished in a variety of ways, such as grant programs, teaching with technology awards, professional development

stipends, publishing support, staff support, and consideration in tenure and promotion reviews.

CONCLUSION

These ten recommendations, if executed in a thoughtful and timely manner, could not only preserve the most compelling attributes of the Wake Forest teacher-scholar ideal, but also amplify the impact of our teaching, scholarship, and creative production efforts. These recommendations intentionally build on existing resources and institutional capabilities, enabling their pursuit in the very near future; additional resource requirements, where necessary, lend themselves to external funding opportunities.

The recommendations offered herein also reflect a deep optimism regarding the future of our institution. The ways in which we participate in and contribute to the broader social, cultural and economic systems within which we exist are changing rapidly. The year 2020 will, in all likelihood, bear strong resemblance to our current environment, but underlying the similarities strong currents of change will be manifest. Perhaps more than most institutions of higher learning, Wake Forest is exceptionally well poised to seize upon opportunities to enhance our already substantial vitality and relevance. The door is now open for us to involve ourselves forthrightly in the momentum that already is transforming the face of higher education. It is a challenge to which we have risen before, and to which we can - and must - rise once more.

Appendix 1: Vision 2020 Committee Members

The Vision 2020 committee consisted of seventeen members of the Wake Forest community:

- Bernadine Barnes - Professor, Art History
- Joseph Belangia – Wake Forest Fellow, Information Systems, 2014-15
- Laura Chin – Wake Forest Fellow, Information Systems, 2013-14
- Jennifer Collins - Professor of Law; Vice Provost
- Nancy Crouch - Deputy CIO, Information Systems
- Kyle Denlinger - eLearning Librarian, Z. Smith Reynolds Library
- Jerid Francom - Assistant Professor, Spanish and Linguistics
- Ana Iltis - Associate Professor, Philosophy; Director of the Center for Bioethics
- Christopher Knott - Professor of Law; Associate Dean for Information Services and Technology, Law School
- Brenda Knox - Director of Online Education
- Caroline Lee - Student Representative, President of Student Technology Committee
- Rick Matthews - CIO, Information Systems; Professor, Physics, Co-chair
- Gordon McCray - Associate Professor, School of Business; Associate Dean of Academic Programs, School of Business
- Clinton Moyer - Postdoctoral Fellow, Divinity School
- Jeffrey Nichols - Instructional Technology Specialist, Religion and Anthropology Departments
- Lynn Sutton – Vice Provost and Dean, Z. Smith Reynolds Library, Co-chair
- William Turkett - Associate Professor, Computer Science
- Alessandra Beasley Von Burg - Associate Professor, Department of Communication

Appendix 2: Charge to the Vision 2020 Committee

The Vision 2020 committee will lead a campus exploration of the future of academic computing technology, including but not limited to the following:

- Assess the availability of cloud-based technologies that support the academic mission, with particular attention to alternatives to Windows client software as locations for the undergraduate standard load.
- Facilitate assessment of the effectiveness of such software in different user environments, ranging from high-quality connectivity, to more limited connectivity typical of home networks, as well as offline use.
- Identify new functionalities supporting the academic mission not possible with standalone client software.
- Identify technologies and skills needed to support a cloud environment.
- Identify the role of locally-hosted cloud solutions (virtual computing labs and private cloud) vs. third party solutions.
- Identify opportunities and limitations for device independence as software and services are delivered via the cloud.
- Identify security concerns related to cloud computing and to types of data that may need additional protection or approvals.
- Identify where online and blended education have the potential to enhance learning and recommend strategies to support these.
- Consider collaboration as a core competency.
- Facilitate the assessment of game-based learning.
- Identify strategies for improving learning analytics.
- Ensure that adopted technology can be a tool for supporting and enabling diverse approaches, learning styles, and perspectives, rather than creating a digital divide.
- Facilitate the adoption and creation of effective rich, interactive, adaptive texts.
- Recommend strategies to exploit free and affordable texts, journals, and monographs, both as consumer and creator.
- Recommend strategies to expand and build robust, accessible public archives of our scholarship and data.
- Identify avenues to enhance learning and scholarship via wearable computing.
- Explore mobile web and mobile apps as opportunities for “access to everything everywhere.”
- Identify avenues to enhance learning, scholarship, and creative activity via the “internet of things.

Appendix 3: Process

The observations and recommendations set forth in this white paper are reflective of primary and secondary research conducted by members of the Vision 2020 committee during the 2013/2014 academic year, with review and refinement in 2014/2015, based on community feedback. Literature reviews, site visits and interviews were employed extensively (see Appendix 4). Emphasis was placed on interactions with recognized experts in their respective fields. The committee elected to "divide and conquer" its substantial charge (see Appendix 2), forming three topically oriented sub-teams:

1. *Team Teaching and Learning*. This team focused primarily on the role of technology and instructional space (past, present and future) at Wake Forest.

2. *Team Cloud.* This team focused on the likely effect of cloud computing on a wide array of dimensions pertaining to computing at Wake Forest.

3. *Team Open/Scholarship/Data*. As its name suggests, this team focused on an array of issue not easily captured under either of the other two teams.

Appendix 4: Visits & Interviewees

- Polly Black, AVP and Director, Center for Innovation, Creativity and Entrepreneurship, and Professor of Practice, School of Business, WFU
- Kel Boyer, Lilien Systems
- Malcolm Brown, Director, EDUCAUSE Learning Initiative (ELI) Jaime Casap, Global Education Evangelist, Google Inc.
- Andy Chan, Vice President, Office of Personal and Career Development, WFU
- Wesley Chen, Engineer, Google Inc.
- Will Clarke, Senior Systems Administrator, Z. Smith Reynolds Library, WFU
- Veronica Diaz, Director of Online Programs and Associate Director of ELI
- Thomas Dowling, Director of Technologies, Z. Smith Reynolds Library, WFU
- Lance Ford, Education Advocate, Cisco Inc.
- Shelli Fowler, Senior Director of Networked Pedagogies and Director of NLI, Virginia Polytechnic Institute and State University
- Claire Gilbert, Associate Director for Strategy and Analysis in Information Technology, Virginia Polytechnic Institute and State University
- Kevin Gilbertson, Web Services Librarian, Z. Smith Reynolds Library, WFU
- Karen Gray, Assistant Director of Emerging Technologies and New Ventures, Virginia Polytechnic Institute and State University
- Casey Green, Founding Director, The Campus Computing Project
- Dan Johnson, co-creator of Biobook, Associate Teaching Professor, Biology, WFU
- William Kane, Digital Publishing, WFU
- Molly Keener, Scholarly Communication Librarian, Z. Smith Reynolds Library, WFU
- Carter Kersh, Juniper Networks
- Jon Landis, Development Executive, Apple Inc.
- Jeremy Larensen, Distinguished Systems Engineer, Global UCC Strategy, Cisco Inc.
- Mark Medovich, Juniper Networks
- John Moore, Strategy and Planning for Learning Technologies, Virginia Polytechnic Institute and State University
- Susan O'Day, Chief Information Officer, Disney Corporation
- John Orbe, Juniper Networks
- Jordan Pedraza, Enterprise Education Team, and Google Project Manager for WFU Google Apps implementation, Google Inc.
- Jen Phillips, University Relations Manager, Google Research, Google Inc.

- Lauren Pressley, Associate Director for Learning & Outreach, Virginia Polytechnic Institute and State University Library
- Catherine Ross, Director of the Teaching and Learning Center, WFU
- Mary Schlegelmilch, Business Development Manager, Cisco Inc., and President, Nebraska Distance Learning Association
- Joe Schueller, Global Collaborations Sales and Strategy, Cisco Inc.
- Oliver Schuermann, Juniper Networks
- George Seimens, professor, researcher, and strategist at the Technology Enhanced Knowledge Research Institute (TEKRI), Athabasca University
- Jessica Shannon, Juniper Networks
- Mike Sims, Juniper Networks
- Jennifer Sparrow, Director of Emerging Technologies and New Ventures, Virginia Polytechnic Institute and State University
- Jared Stein, Vice President of Research and Education, Infrastructure
- Paul Whitener, Network Architect, WFU Information Systems
- Carl Wiese, Senior Vice President, Global Collaboration, Cisco Inc.

- 2013-2014 Wake Forest Fellows, Alumni (‘13)
  Paige Bosworth
  Francie Fisher
  Ben Magee
  Jim O’Connell
  Lindsay Schneider
  Sarah Sebton
  Brad Shugoll
  Lauren Suffoletto
  Katie Wolf

- WFU faculty members
  Alessandra Beasley Von Burg
  Bernadine Barnes
  Ana Illtis

- Students in the course entitled “Design Thinking and High Performance Teams” taught by Evelyn Williams and Gordon McCray. Student teams were charged with designing a new educational experience for Wake Forest students as envisioned in the year 2020.