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The Interface of Technology in Culinary Arts Education

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THE INTERFACE OF TECHNOLOGY IN CULINARY ARTS EDUCATION

by

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Introduction

A culinary educator must make many decisions that affect the day-to-day activities in both the classroom and the lab. One of the more important decisions is how to select the most appropriate technology to implement for use in teaching and administrative activities. The research presented here is intended to help the educator identify specific needs, decide where the use of technology is desirable, and offer information designed to help the educator make an informed decision about using technology as a teaching tool.

Purpose Statement

The purpose of this paper is to inform the culinary educator about the technology available for use in both the classroom and the lab setting. There is an ever-increasing pool of technology, making it more important than ever that the educator choose the appropriate lab/kitchen equipment and software programs for use in a specific culinary program. Making an informed decision ensures maximum usefulness of the technology in the setting.

The issues to address are:

- Evaluating the technology-related skills students will need to develop in order to be successful in the job market;

- Determining which equipment, features of that equipment, and software options provide the platform for teaching those specific skills;

- Factoring in variables such as serviceability (how quickly is this technology likely to become obsolete? Will upgrades be available and affordable?), cost-effectiveness (does the potential benefit to students and the institution outweigh

the cost of the initial investment of money and manpower), and the ease of interface between front-of-the house technology and kitchen equipment.

The first phase of research – determining the requisite skills – will be accomplished by interviewing a representative sample of local culinary employers and culinary educators. The sample will include casual dining restaurants as well as fine dining establishments and institutional foodservice settings.

The next phase of the research will be to compare and contrast selected kitchen equipment and software, as well as software tools available to the instructor for use in recordkeeping and lesson delivery.

Because today's culinary students will be expected to be familiar with the technology they encounter in the workplace as well as knowledgeable about food preparation, it is incumbent on the educator to provide access to that technology as part of the learning process. After reviewing this research, the culinary educator should have the requisite information to make appropriate choices about using technology in the classroom and lab settings and be prepared to present a proposal for implementing the use of the technology. The approach described is applicable to all Culinary Arts education programs; however, this paper will use H. Councill Trenholm State Technical College (Trenholm) in Montgomery, Alabama as an example. At Trenholm, the final purchase proposal would be submitted to the Dean of Academics, Dean of Technology, and the Dean of Finance.

Justification

The introduction and emergence of technology specifically designed for use in restaurants, hotels, and other service environments offers opportunities for streamlining service, recordkeeping, inventory management functions, menu design and evaluation, and production.

Computer software has grown more user-friendly and now enjoys wide-spread popularity within the hospitality industry. Part of this popularity can be attributed to the fact that there has been a shift from proprietary software to open architecture or non-proprietary software. This trend has facilitated interaction between software designed by different developers.

Using technology in the classroom allows the instructor to present materials in various mediums, sometimes simultaneously, expressing it in forms that are identifiable to multiple learning styles. Education website Edutopia published a brief article in which the staff writer asserts, "The myriad resources of the online world also provide each classroom with more interesting, diverse, and current learning materials." (Staff, Why Integrate Technology into the Curriculum?: The Reasons are Many., 2008)

Lecture can be complimented with PowerPoint presentations illustrating important data, allowing visual learners, as well as auditory learners, to have full understanding. Technology such as video presentations can also enhance the student's enjoyment of the learning process. Other benefits of using media and technology, as identified by Oliver Krill in his study titled Benefits and Risks of Media and Technology in the Classroom include the abilities to illustrate real-life applications, add color to the subject, share teaching tools with other teachers, and mine the other interests of students. (Krill, 2007)

For example, *Cor*Tec™ applications, specifically *Chef*Tec™ can also be customized for use in the Hospitality Education lab setting as part of inventory, purchasing, production, and recipe and food costing lessons. All the capabilities of *Chef*Tec™ are relevant to culinary arts education, whether the student's career goal is to work front-of-the-house or back-of-the-house. Because there is such a broad spectrum of technology to choose from with applications for use in both the classroom and kitchen/lab, the culinary educator should seek to be well-informed before selecting hardware and software.

<div align="center">Constraints</div>

The anticipated self-imposed constraints on this research are the number of employers to be interviewed and ensuring that the sampling pool includes a representative from a fine dining restaurant, a casual dining restaurant, and an institutional foodservice operation in the local market. It is important to impose these constraints in order to preserve the quality and accuracy of the results. External constraints on the proposed research are the level of cooperation received from the employers in responding to the interview. Other constraints are the lack of literature specifically relating to the use of technology in Hospitality and Culinary Arts education, as well as the fact that the available information about specific kitchen equipment and classroom software will come from the manufacturer and is intended to be used as a sales tool.

Glossary

Back of the house: Refers to the food production area of a restaurant.

Blog: A type of website or part of a website. Blogs are usually maintained by an individual with regular entries of commentary, descriptions of events, or other material.

***Chef*Tec™**: One of the *Cor*Tec™ software products used for recipe and menu costing, inventory control, nutritional analysis, purchasing, and ordering.

***Cor*Tec™:** Manufacturer of software for culinary applications.

Ferule: An instrument, such as a cane, stick, or flat piece of wood, used in punishing children.

Front of the house: Refers to the guest service area of a restaurant.

iPad: A line of tablet computers designed, developed and marketed by Apple primarily as a platform for audio-visual media including books, periodicals, movies, music, games, and web content.

Open architecture software: The specifications of open-architecture software are made public so that third-party vendors will have the capability to develop add-on products.

Podcast: A series of digital media files that are released episodically and often downloaded through web syndication.

Proprietary software: The use of proprietary software is controlled by the manufacturer through the use of licensing. The licensee is not permitted to modify or distribute this software.

Scantron: A company that manufactures and sells machine-readable papers on which students mark answers to academic test questions, the machines to analyze those answers, survey and test scoring systems, the taking of school attendance (with a mark denoting an absent student) and image-based data collection software and scanners.

Stereoscope: An optical instrument with two eyepieces used to impart a three-dimensional effect to two photographs of the same scene taken at slightly different angles.

Wiki: A website that allows the creation and editing of any number of interlinked web pages via a web browser using a simplified markup language or a **WYSIWYG** text editor**.**

Overview of Technology in United States Education

To fully understand the role of technology in culinary education it is first necessary to understand the general role of technology in education. The use of technology, broadly defined, in the United States classroom can be traced back to Colonial times. About 1650, teachers were using wooden paddles with printed lessons known as a Horn-Book. During the 1850s a combination pointer and disciplinary tool called the Ferule became a staple in the classroom. (Wilson, Orelanna, & Meek, 2010)

By 1870, (Wilson, Orelanna, & Meek, 2010) more modern devices were beginning to come into the mainstream. Among these are an early incarnation of a slide projector called the Magic Lantern, writing slates and chalkboards. By 1900, the slate had been virtually replaced by pencil and paper. Around the turn of the century the stereoscope, which was also a popular form of home entertainment, was introduced to schools by the Keystone View Company. The stereoscope was rather quickly replaced by the filmstrip projector. Interestingly, in 1913 Thomas Edison predicted that "books will soon be obsolete in schools. Scholars will soon be instructed through the eye." (Wilson, Orelanna, & Meek, 2010, p. 7)

Until 1925, when the New York City Board of Education implemented the use of radio broadcasts as a method of lesson delivery, the technology available was primarily for visual enhancement of the teaching process. The use of visual aids far outpaced the advent of auditory tools until the1950s when the language-lab headset allowed students to use audiotaped drills and repetition as a tool for learning foreign language. (Wilson, Orelanna, & Meek, 2010)

Visual technologies continued to evolve. The filmstrip projector, which was originally used by the U.S. military as a training tool during World War II also found favor in schools.

When the Mimeograph gained popularity beginning in 1940, it was the state-of-the art

technology for producing multiple copies of documents.

Educational television was introduced around 1958 and by the early 1960's in excess of

fifty channels offered educational programming across the U.S. (Wilson, Orelanna, & Meek,

2010).   Another popular visual teaching tool, the filmstrip viewer, came along in 1965. By the

early 1970's, the technology we are familiar with began to appear in the classroom. When the

hand-held calculator was introduced, some teachers were reluctant to allow their use, claiming it

would serve to undermine the learning of basic mathematical skills.

The Scantron was the earliest automated grading device. Students used specially-

designed answer sheets which the machine was programmed to "read" and score. (Wilson,

Orelanna, & Meek, 2010) In rapid succession beginning in 1980, desktop computers, the CD-

ROM drive, and hand-held graphing calculators gained acceptance among both educators and

students.   Although government scientists had set into place the foundation for the internet in

1983, its use was initially limited to government agencies and commercial use of the internet was

banned until 1993. (Hall, 2009) Once the ban was removed, the internet grew exponentially,

rapidly adding new features and capabilities. Now, "the medium itself has become a virtual

classroom through which students, especially at the college level, can take courses and even earn

degrees." (Hall, 2009, p. 2)

The most current technologies began appearing with the Interactive Whiteboard about

1999. The interactive version of the whiteboard combined a touch-detecting screen, image

projector, and a computer, allowing the instructor to present multi-media lessons. Students

became interactive with the advent of the iClicker in 2005. Use of the iClicker provides the

instructor with instantaneous feedback to quiz questions; no manual grading required. (Wilson,

Orelanna, & Meek, 2010)

Student use of technology has also become a factor in the classroom setting. As our

society has embraced video games, laptop computers, and now mobile devices, the students who

have grown up with these resources have come to expect that they will be part of the educational

experience. Currently the iPad is becoming increasingly popular among students.   Because of

its portability, large memory capacity and ease of use, it may likely be the educational tool that

will fulfill Edison's prediction.

Most current college students are comfortable with technology as part of their daily lives.

A survey of 4,374 college students at thirteen institutions of higher learning in five states

revealed that 93.4% of them own a computer (Kvavik, 2005). Not only do they have access to

the technology, "These students possess unprecedented levels of skill with information

technology; they think about and use technology very differently from earlier student cohorts."

(Kvavik, 2005, p. 1)

<div align="center">Technology and the Learning Process</div>

Technology is now inextricably intertwined with the educational experience for both

students and instructors. The issue of how technology affects the learning process has been of

interest to researchers for a number of years.

During what could be called the infancy of modern technology in education, the seeds for

a debate over its influence on learning were sown. Early studies, dated between 1994 and 2000,

led researchers to conflicting conclusions about the relationship between learning and

technology. At that point in time, students had only been using PCs for about fifteen years and

the Internet for less than ten so the early research tended to yield negative results. As the use of

computers and the Internet grew, researchers concluded that using technology can enhance

teaching and learning. Khan, (2009), quoting Bransford, et al (2000), listed four ways that

Information and Communication Technologies (ICT) could influence the United States'

education system: "(1) new curricula based on practical examples; (2) technological tools to

boost learning; (3) more opportunities for feedback and reflection for teachers and students; and

(4) network of teachers, students, parents, and many other interested parties." (Khan, pp. 2-3)

These changes are already occurring.

In *Technology in Education: Looking Toward 2020*. (Nickerson & Zodhiates, 1988),

Thomas K. Landauer discussed the development of technology he calls cognitive tools.

Landauer offers his definition of a cognitive tool as "a technological device that helps people do

cognitive tasks…" (Nickerson & Zodhiates, 1988, p. 11), particularly mathematical calculations

and information retrieval. Landauer predicted that by 2020, the major effects of using these

cognitive tools, including changes in education, will be evident.   Landauer states that, because

of the impact of technology on the educational process, educators should rightfully partner with

psychologists and computer scientists to develop these cognitive tools. Part of developing this

technology is to "analyze what people find difficult in performing intellectual tasks and then find

ways to have a computer make it easier". (Nickerson & Zodhiates, p. 16). Such a partnership

affords educators an excellent opportunity to provide input as to how technology can best help

them and their students by identifying the difficult intellectual tasks students face and

participating in finding creative solutions that will allow them to use a computer to facilitate the

accomplishment of those tasks.

In 1994, Far West Laboratory (now WestEd) reviewed the results of 100 internal studies and studies by other entities, including Software Publishers Association and Apple Computer Inc. The review identified a number of positive influences on student outcomes associated with the use of technology. Among these are: "increases mastery of vocation and work force skills", "significantly improves student problem solving skills", and "increases the preparation of students for most careers and vocations." (Cradler & Bridgforth, 1996, p. 2). Another study commissioned by the Senate and House Committees on Education and Labor reported that the use of technology as a teaching tool promotes "teaching of abstract concepts and problem solving, as well as basic skills", "adaptation of instruction to accommodate student learning styles and special needs" and "less teacher lecture, with more student-centered classrooms" (Cradler & Bridgforth, p. 2)

In 2001 the SouthEast Initiatives Regional Technology in Education Consortium (SEIR*TEC) conducted research to evaluate ways in which technology had or had not been effectively incorporated into the educational process. One of the conclusions of the study was that, in order for technology to be most useful, changes in teaching strategies are indicated. As the report states, "Let's look at what students are learning…then see how technology can make it more effective" (Byrom & Bingham, 2001, p. 5) In other words, the instructor can facilitate student learning by evaluating ways the available technology can be incorporated into lesson delivery. This supported the conclusion by participants in a 1993 forum sponsored by the Federation of American Research Networks (FARNET) and the Consortium for School Networking (CoSN) that "properly implemented and supported, this tool can empower and excite students and teachers…" (Cradler & Bridgforth, 1996, p. 1)

Proper implementation of technology in education mandates recognizing that people learn differently. Dillon & Gabbard, 1998, as cited by Nicholson, Nicholson and Valachich (2008) emphasized the importance of learning style as a consideration in designing technologies to enhance the ability of both visual and verbal learners to process, comprehend, retain, and recall the information presented.. The results of the study suggest that "…a computer-mediated learning environment can be customized around the type of information being disseminated and the targeted individual" and "this would greatly enhance the learning experience for the learner, as they may not have to expend as much effort to learn something if it is delivered in a manner that is more conducive to learning". (Nicholson, Nicholson, & Valacich, 2008, p. 198) As a caveat, the results of the study also showed that such customization of teaching tools would fall short of the intent to enhance learning if not designed to "overcome the amount of cognitive effort associated with certain tasks." (Examining the Effects of Technology Attributes on Learning: A Contingency Perspective, p. 198)

Another factor to be considered as technology is implemented into the educational setting is the variety of available technological tools and their capabilities. E-mail and word processing programs encourage the development of communication skills, particularly writing. Software designed for creating databases of information and spreadsheets furthers the understanding of mathematical and scientific principles.

In *Critical Issue: Using Technology to Improve Student Achievement*, the authors elaborate on the work of Bruce and Levin, who proposed the notion of technology as media and organized that media according to purpose: inquiry, communication, construction, and expression. (Honey, Culp, & Spielvogel, 1999, rev. 2005) This harmonized with the findings of Marshall who stated that the use of educational technology "complements what a great teacher

does naturally" (Honey, Culp, & Spielvogel, 1999, rev. 2005, p. 6) and that it is only one factor in educational success.

A prevalent theme throughout the research is that, while technology is an important tool, it must be chosen carefully and used wisely by well-trained teachers. As Nancy Protheroe (2005; p. 47) pointed out in her report on *Technology and Student Achievement,* "Teachers, not technology, are the key to unlocking student potential. "A teacher's training in, knowledge of, and attitude toward technology and related skills are central to effective technology integration". Successful use of technology facilitates interaction between student and teacher, supports cooperative learning among students, and enhances problem-solving skills.

Teaching with Technology

Today's teachers have virtually unlimited access to technological tools and resources for use in lesson delivery yet many are "less familiar and less comfortable with technology than their students" (Starr, 2010, p. 1) and therefore "struggle to seamlessly integrate a growing list of technology tools into their regular curriculum" (Starr, 2010, p. 1). Adding to this struggle, many teachers are concerned about tech support and training. At the same time, according to instructional technology consultant Jayme Swinford, "Students are coming to class with more skills. Whether a teacher requires it or not, most students use technology for their projects." (Starr, 2010, p. 1) This can result in a digital literacy gap between students and teachers.

One solution to this quandary is professional development focused on technology. (Staff, Technology Trends in Higher Education, 2006). Adequate training and technical support/problem resolution can play an important role in encouraging faculty to make the best use of the technological resources at their disposal. With this support network in place, along

with the availability of user-friendly and convenient technological tools, the foundation is in place to encourage incorporation of tech-savvy teaching techniques in lesson delivery.   As expected, "teachers who spent more time in professional development activities were generally more likely … to indicate they felt well prepared or very well prepared to use computers and the internet for instruction." (Smerdon & Cronen, 2000, p. iv).

A logical way to implement this solution is to coordinate professional development with initiatives targeting students. When the Henrico County, Virginia Public School system decided to change computer platforms and provide Dell notebook computers in the high schools during the 2004-2005 term, professional development was a part of the process. The professional development plan was designed with an important goal in mind: "Rather than simply learning the basics of a technology tool, teachers must learn how to use it to improve teaching and learning." (Jones, 2007, p. 23). To confirm the effectiveness of this professional development initiative, the school system surveyed students, teachers, and administrators as well as parents. The results documented widespread support, with almost 90% of the teachers reporting a favorable opinion of the program. (Jones, 2007)

Formal professional development is not the only method of addressing the computer literacy gap between teachers and students. According to the tech team at Education World.com, using the students' familiarity and comfort with technology can be an excellent way to bridge the gap. Libby Adams of Education World endeavors to develop the potential of student trainers, who in turn assist teachers and other students in mastering the use of specific software. (Hopkins, 1999; updated 2005) Susan Meyers' approach is to train students and teachers together. Again, the result is that students and teachers learn from each other. (Hopkins, 1999; updated 2005)

The most familiar technology used in education is the Internet. The World Wide Web, in addition to being an entertainment medium, is a vast repository for information. As Swinford (Starr, 2010) notes, the Internet is the tool students most frequently use for projects. The web is evolving and users now have the opportunity to participate in the creation of information as well as accessing what is already available

Using technology in the classroom allows the instructor to present materials in various mediums, sometimes simultaneously, expressing it in forms that are identifiable to multiple learning styles. Education website Edutopia published a brief article in which the staff writer asserts, "The myriad resources of the online world also provide each classroom with more interesting, diverse, and current learning materials." (Staff, Why Integrate Technology into the Curriculum?: The Reasons are Many, 2008, p. 1)

Graphic presentation software such as PowerPoint allows teachers to readily supplement lecture with audio-visual learning aids and even create interactive presentations if they so desire (Starr, 2010). Excel has the capability of sorting and classifying data once it has been entered and display reports in various formats such as graphs and charts. Word processing programs make tasks involving writing much simpler. A computer with these applications installed is an extremely valuable and versatile tool for the instructor.

Technology can also be a useful tool and resource for keeping students, particularly those who could be considered at-risk for dropping out or failing, engaged in the learning process by challenging them. It can also "help students develop positive cooperative learning relationships, enabling them to work together while researching topics and creating presentations." (Means, 1997, p. 1)

Two additional technology tools instructors are likely to find especially useful in the classroom are SMART Board™ and GradeQuick. The SMART Board™ is an inter-active whiteboard system integrating a projector and multimedia devices such as DVD players and digital cameras. This application can be used to broadcast demonstrations to multiple classrooms, allowing students to interact with each other while working in different areas.

Distance learning has brought even more technology to the forefront of education. Now, not only can the instructor maintain contact with students via e-mail, with the addition of a microphone and camera, he or she can present the lesson in the form of a Podcast, either in real-time or as an on-demand "movie " students can view at their convenience.   Advances in technology have made planning, creating, editing, and publishing Podcasts a relatively user-friendly process (Scragg, 2011).

The demands on teachers' time are many. Administrative activities used to consume many hours, often out-of-class, for record-keeping: grading assignments, finalizing term grades, attendance reporting, and the like. Fortunately, these tasks can now be accomplished in much less time using technology. The manufacturer of Grade Quick, Edline, describes it on the company website as "…the umbrella solution that brings together best-in-breed web communication and classroom management tools to work together…" (Staff, Edline, 2010). With this software, the instructor has the ability to publish assignments and due dates, grades, attendance records, notify students of missing or incomplete work, and coordinate on-line discussions.   A smart phone or tablet computer allows students to check their status in the class at any given time.

Learning with Technology

The majority of today's college students were born after the introduction of the microcomputer. Because they have grown up with technology, they are very comfortable using it. Not only are they familiar and comfortable with technology, they expect it to be a part of their educational experience. The 2010 21st-Century Campus Report documents that 95% of current high school students anticipate they will use technology in at least some of their college coursework and 93% identified campus technology as an important factor in their choice of college. As the Millenial Generation prepares for college over the next ten years or so, they will expect to use technology for classwork as well as to communicate with both instructors and classmates. Seventy percent of the respondents to the CDW-G survey (CDW Government LLC, 2010) are expecting to use technology in college that will prepare them for using the technology applicable to their chosen career. Those respondents also identified these five technologies as extremely important: wireless network, access to campus network from off-site locations, course management system, digital content (online materials), and multimedia content streaming (CDW Government LLC, 2010). In another study, 80.7% of those who responded agreed with the statement "I like to learn through listening to audio or watching video content" (Smith & Caruso, 2010)

Technology is also a part of student life outside the classroom. Between 2007 and 2010, the number of respondents using social networking websites grew from one-third to greater than 75%. Ninety-six percent of those said they used social networking to stay in touch with friends, 51.5% stated they used it to communicate with classmates about (Smith & Caruso, 2010).   The prevalence of text messaging among college students cannot be ignored as 72.9% of the respondents said they used this technology daily (Smith & Caruso, 2010).

Technology in Vocational Training

Not only is technology a part of traditional education, it is used in some form at the majority of workplaces. Therefore, training for using the associated technology should be a part of vocational education, including that related to the hospitality industry. "Vocational training colleges together with industry are confronted with the need to develop and integrate theoretical and practical learning sequences that are able to fulfill the demands for multi-skilled technicians and skilled workers" (Müller & Martins Ferreira, 2004, p. 1). In the realm of vocational education, multimedia, computer-based teaching is advantageous for several reasons. First, computer-based instruction is user-driven and self-paced, allowing flexibility for the learner. Next, there can be just-in-time learning and just-in-place learning, relating the material to the workplace tasks and timing (Konradt, 2004). Finally, computer-based instruction is cost effective, generating savings for both student and the institution or sponsor.

The use of multimedia instruction can also be used to compliment traditional teaching methods in the vocational setting. An excellent example of such a pairing would be the culinary student who first watches video of the procedure for cutting up a chicken, then goes into the lab for hands-on practice.

In the kitchen (lab), the student is given the opportunity to gain hands-on experience using the equipment and tools found in the back of the house. Perhaps the most technologically advanced piece of equipment is the combination oven, with capability to cook using convection, steam or both (Shames, 2004). The student will also be expected to learn proper operation of other basic equipment such as commercial range/oven (often found in smaller foodservice operations), commercial fryer, and hot food holding cabinet.

Technology in the Hospitality Venue

The introduction and emergence of technology specifically designed for use in restaurants, hotels, and other service environments offers opportunities for streamlining service, recordkeeping, inventory management functions, menu design and evaluation, and production. Computer software has grown more user-friendly and now enjoys wide-spread popularity within the hospitality industry. This also dictates that a part of training for those desiring careers in the hospitality industry includes ensuring that the student becomes familiar with the technology he or she will encounter in the workplace. Some high-end restaurant kitchens have more advanced technology like The Anti-Griddle™. Manufactured by PolyScience©, this unique piece of equipment looks like the traditional griddle, but is actually used to quickly freeze sauces or purees as part of desserts or appetizers. In a high-end kitchen the student might also encounter a Sous Vide cooking system in which vacuum-packed foods are prepared in a water bath at precisely-controlled temperatures.

Particularly where they will be using the more sophisticated technology, the culinary student must become familiar with the principles if not the specifics of how the technology works.

Part of the growing popularity of technology tailored for use by the hospitality industry can be attributed to the fact that there has been a shift from proprietary software to open architecture or non-proprietary software. This trend has facilitated interaction between software designed by different developers. While proprietary software proved to be cumbersome and restrictive, in the current environment "Users can pick and choose the most effective management tools, without being limited by the technological capabilities, time constraints, or pricing structures of any single vendor." (Grossbauer, 1997, p. 1),   Being able to select the most

appropriate tools for use in purchasing, receiving, inventory control, menu planning, and point-of-sale transactions for the specific workplace is key to maximizing the value of the investment in the software. As Gordon Meister, marketing director of hospitality systems at NCR Corporation observed, "I think all the vendors are moving and recognizing that everybody has different requirements and different demands." (Staff, Computers and Foodservice: The Future is Now, 1988, p. 1)

In response to the varied combinations of customer needs, software producers have created innovative and adaptable applications for the hospitality industry. One example of this is *Cor*Tec™. This software includes functions related to recipe and food costing, inventory control, and purchasing; including the ability to interact on-line with purveyors. According to the manufacturer, it is suitable for use by a single-unit operation, but can also be customized for use by multi-unit restaurants and hotel chains.

Alternatively, the manager may choose the QPM (Quality Production Management) system by Kitchen Brains. This software enlists "an algorithm that analyzes restaurant operations automatically…" (About Kitchen Brains, 2011). Kitchen Brains analyzes data from the foodservice operation and generates reports of sales trends, inventory, and can quickly create food or supply orders accordingly. Not only can Kitchen Brains accomplish all of these tasks, it can also alert the kitchen staff when to start cooking and when food has been held past the prescribed time limit.

Not only has software grown more user-friendly and efficient, as well as encouraging creativity for the foodservice professional, a host of new applications for technology have been designed to interact with mobile devices. Customers are able to create and confirm hotel and restaurant reservations, submit carry-out food orders, and even pay for their purchases using

mobile devices. As social networking sites such as Facebook and Twitter are now a part of the

mainstream, especially with younger consumers, many foodservice operation managers have

come to agree with Barry Fridley, who writes in his on-line blog, "I think some sort of online

presence/community will be 'expected' by customers" (Fridley 2009)

The application of technology in the foodservice and hospitality industry not only affects

the relationship between the business and the customer, it also extends to the internal relationship

between front-of-the-house and back-of the house functions. Point of sale software can be used

to relay orders directly to the kitchen and monitor the progress of food preparation. This process

streamlines customer service by eliminating the time lag between the server taking the order and

the order being presented to the kitchen for preparation. It also avoids miscommunication

between servers and kitchen staff and allows the server to check the status of a specific order at-

a-glance.

There is no question that technology is now a permanent part of the hospitality and

foodservice business. "There is more information out there than ever before, and ensuring that

information is clearly communicated and successfully absorbed is the best way to prepare

today's students and tomorrow's hospitality industry professionals for a vibrant and prosperous

future," (Kish, 2010, p. 3). Therefore, it is imperative that educators stay current with the new

and exciting applications for technology in the workplaces our students are preparing to enter. It

is certain they will be exposed to technology in that workplace, in some cases beginning with on-

the-job orientation and training. As Albano (2007) reports in Computer Savvy Cooking: How

Technology is Dominating the Workload for Chefs states, "I also make training guides in MP3

audio files to train the staff as well." So, how should educators go about teaching students about

the technology they will be using in the workplace? One of the most important ways is to ensure

that the technology in our labs and classrooms is current and instructors are knowledgeable about and comfortable with it.

Prioritizing Training in Technology for Culinary Arts Students

In order for technology to be most useful it must be well-suited to the task, whether a front-of-the-house application used to schedule reservations or specialized programmable food preparation equipment used in the back-of-the-house. The most logical first step in determining where the Culinary Arts instructor should place priority in selecting technology for use in the training program is to learn what technology is being used in the workplaces that will be hiring students during apprenticeship and after the completion of their training. Managers of local foodservice operations are the definitive source of this information.

Well-designed interviews with managers representing a cross-section of area foodservice establishments can elicit details about how technology is used in their respective operations, which in turn dictates the basic technological skills they expect from applicants. Armed with this information, the Culinary Arts instructor can make informed decisions with the confidence that the resources invested in purchasing and maintaining the equipment are justified. Another primary consideration in deciding what technology to incorporate into the training program is the investment of time and energy by the students and instructor. This investment must also reap benefits in the form of marketable skills.

Review of the literature clearly indicates the necessity of incorporating technology into Culinary Arts education. H. Councill Trenholm State Technical College in Montgomery, Alabama trains culinary students from many of the contiguous United States, as well as several foreign countries. Many of the students are in the process of changing careers and have not been

exposed to the use of technology in the hospitality industry. Incorporating training and experience using the industry technology is vital to meeting the goal of teaching them all the skills they will need to be successful in their culinary arts careers.

To evaluate the most beneficial investment of resources in the purchase of technology for the Culinary Arts program, the instructor must first select instructional software and tools from the available options.

First, the instructional software must be chosen from the available options. Internet research results identified three major educational software purveyors: engrade, OnCourse, and Gradebook. The only free option, engrade, is a single-purpose download. Since this is not a viable option because it does not have the requisite capabilities for managing class data, it must be ruled out. GradeQuick is an affordable option offering all the capabilities a post-secondary instructor would require, particularly for distance-learning courses. Table 1 shows a comparison of the features of each program

Table 1

Comparison of Instructional Software

Features	engrade	OnCourse	GradeQuick
Gradebook	✓	✓	✓
Messaging		✓	✓
Assignment Calendar		✓	✓
Quizzes		✓	✓
Discussions		✓	✓
Attendance		✓	✓
24/7 access	✓	✓	✓
Price Per license	Free	*(unavailable)*	$59.95

Appropriate hardware tools should also be part of the technology purchase.   Because of

their growing popularity and versatility, the instructor should have access to a tablet computer.

The tablet computer can serve a number of purposes in the classroom, including showing Power

Point presentations, interfacing with the SmartBoard, and being used as an e-reader.

Additionally, the tablet computer could be programmed with *Chef*Tec™ or Aloha software for

use in training.   Several popular models are compared below.

Table 2

Comparison of Tablet Computers

	Apple iPad	H.P. Slate	Dell Streak	BlackBerry PlayBook
Operating System	iOS	Windows 7	Android	BlackBerry Tablet OS
Apps	40,000+ iPad apps through the Apple App Store; 300,000+ compatible iPhone apps	Most Windows programs	More than 100,000 Android apps	PlayBook-specific apps via BlackBerry App World
Flash Support	No	Yes	Yes	Yes
Screen	9.7" 4:3 IPS screen	8.9" wide screen	5" TFT LCD	7" wide screen LCD
Screen Resolution	1024 x 768	1024 x 600	800 x 480	1024 x 600
Camera	Front and rear-facing cameras.	VGA webcam for videoconferencing, 3MP camera on reverse side	VGA camera for videoconferencing; 5MP camera on reverse side	3MP camera for videoconferencing, 5MP camera on reverse side
Ports	Apple dock connection, HDMI	U.S.B.	U.S.B.	U.S.B., HDMI for video out
Navigation	Compass, assisted GPS (3G version only)	None	Compass, GPS	None
Storage	16, 32 or 64 GB	64 GB	MicroSD card slot (16GB pre-installed)	16, 32 or 64 GB
Wireless	Wi-Fi, Bluetooth, 3G (some models)	Wi-Fi, Bluetooth	Wi-Fi, Bluetooth, 3G	Wi-Fi, Bluetooth (3G via BlackBerry phone tether)
Estimated Battery Life	10 hours,	5 hours	10 hours talk time, 400 hours standby	Unknown
Dimensions	9.5" x 7.3" x 0.34"	5.91" x 9.21" x 0.58"	6" x 3.1" x 0.4"	5.1" x 7.6" x 0.4"
Weight	1.33 pounds	1.5 pounds	0.48 pound	0.9 pound
Wireless Plan	$15 or $25 a month via AT&T (No contract); $20 to $50 a month via Verizon		2-year AT&T contract or buy unlocked at full price	
Price	$500-$830	$800	$550 ($300 with 2-year contract)	$499-$699

The Apple iPad is the front runner of these options based on the variety of features it

offers and its overall affordability. The others all offer less capability at the same or higher

price.

The process of determining where to devote instructional time and invest limited financial resources for the purchase of industry-related technology began with interviewing Gary Garner, James Ryals, and Don Johnson, managers of three local foodservice operations representing a cross-section of casual dining, fine dining, and institutional service. These professionals were all asked the same eight questions (See Appendix A).

All three respondents reported using *Chef*Tec™ and/or Aloha Systems software for a number of front-of-the-house, back-of-the house, and administrative functions.   The primary front-of-the house functions were managing reservations and order tracking. In the back-of-the house, the managers found technology useful for inventory control, menu pricing, recipe conversion, nutritional analysis, and managing patient menus.   Administrative functions such as scheduling and payroll were also streamlined using these technologies. They indicate that the interactive capability of the technology to share information, for example, monitoring inventory levels based on sales data, saves time and contributes to the overall efficiency of the operation. The managers of both the fine dining establishment and the casual dining restaurant identified one of the benefits of having technology to facilitate these day-to-day tasks is that they are able to spend more time interacting with their guests. Upgrades to the technology are at regular intervals, either yearly or every two years.

All three kitchens are equipped with a combi oven. The fine-dining establishment added an Anti-Griddle® within the past six months and has induction cooking capability. The manager acknowledges that the Anti-Griddle® purchase was a substantial investment, but points out that it is the only one in the market at this time and says his staff has enjoyed expressing their creativity by testing new dishes as part of the learning process.   The casual dining restaurant has a Sous Vide cooking system which is now almost three years old.

These managers all stated that they expect their employees to have basic computer skills and be familiar with the basic kitchen equipment. They are willing to train, but agree that the process is much more efficient if the new hire has already had some exposure to the technology in use. All three say the applicant's experience and training relating to the technology they use carries significant weight, as much as 50% - 60%, in the hiring decision.

All of the respondents reported that they expect the foodservice industry's use of technology will continue to evolve over the next two-to-five years, but one expressed concern that "we are losing the human touch". Another points out that "Students still need classical skills" while acknowledging that to be competitive, they must be exposed to the technology.

Based on these responses, the Culinary Arts program must, at a minimum, prepare the students to use *Chef*Tec™ or similar software, a combi oven, and a convection steamer in addition to the conventional oven.

The next step in the process is to determine which of the available products is best suited to the needs of the Culinary Arts program in light of the expectations expressed by the respondents. A comparison/contrast evaluation of the options, as shown in table 3, is a logical method for making this selection.

Since all foodservice operations have a combi-oven, this should be the first item chosen.

Table 3

Comparison of Combination Ovens

BRAND	TYPE	CAPACITY	PRICE	UTILITY COST
Hobart CE10FD-1	Electric	10	$26,460.00	$3.64 kw hr.
Rational CM61G	Gas	12	$13,145.00	$11.85 per 1000 cf
Rational SCC 62	Electric	12	$15,146.00	$3.64 kw hr.
Groen C/2-20EFA	Electric	9	$18,217.00	$3.64 kw hr.
Blodgett BCX-14G	Gas	10	$23,815.00	$11.85 per 1000 cf

Because the students will be expected to know the operation of both electric and gas

appliances, and class size supports having multiple units, it is desirable to have at least one of

each available in the instructional lab.   Of the options above, the two Rational brand models

have the lowest prices. The company enjoys a strong reputation in the market area and a local

representative is available to assist with the details of purchase, installation, and maintenance.

Utility cost information was obtained from Alabama Power Company and Alabama Gas

Corporation.

Table 4 provides data about the next item for consideration, the selection of industry

software for teaching purposes. *Chef*Tec™ and Aloha are two commonly used programs. From

reviewing the product specification sheets on the internet, at first glance, *Chef*Tec™ would seem

to be the better investment. Closer review of the promotional materials reveals the need to

purchase multiple user licenses. The base price also excludes hardware. The Aloha price

includes three POS terminals and the system server. Comparatively, the package offered by

Aloha is the better investment.

Table 4

Comparison of Industry Software

	Inventory Control	Recipe/Menu Costing	Purchasing Ordering	Production	Sales Analysis	Interactive FOH/BOH	Base price
Aloha	Yes	Yes	Yes	Yes	Yes	Yes	$3,500.00
*Chef*Tec™ 11	Yes	Yes	Yes	Yes	Yes	Yes	$995.00

Purchasing Procedure

Having made the appropriate selections, summarized in tables 1, 2, 3 and 4, the instructor

is ready to submit the following purchase proposal to Administration, specifically the Dean of

Instruction.   At Trenholm, proposals for such purchases are accepted on an as-needed basis and

reviewed by the Dean of Instruction, Dean of Finance, and Dean of Technology before being

submitted to the President of the College for final approval. Funding for the purchase of

technology is provided through Title III-B, a Federal program which provides monies to Historic

Black Colleges and Universities.

Once the proposal (table 5) is approved by the President, it is the responsibility of the

Departmental Budget Manager to submit purchase requisitions to the Business Office for

processing, which includes placing the orders with the purveyors.

Table 5

Finalized purchase proposal

Quantity	Description	Unit cost	Extension
1	Rational model CM61G combi oven	$13,145.00	$13,145.00
1	Rational model SCC 62 combi oven	$15,146.00	$15,146.00
1	Aloha POS system (complete)	$3,500.00	$3,500.00
3	GradeQuick software licenses (1 per instructor)	$59.95	$179.85
3	Apple iPad 2 (average price)	$499.00	$1,497.00
		Total (Installation completed by college maintenance staff)	$33,467.85

Conclusion

The Culinary Arts program at Trenholm State Technical College enjoys an excellent

reputation. The program is accredited by the American Culinary Federation and was recognized

as one of twenty-two outstanding programs in 2009. In order to maintain this reputation and

respect, it is vital that the program continue to provide the quality of education and training that

has brought it to this level. An important aspect of maintaining that reputation is ensuring that

students and faculty have access to the most current technology in use in the industry as part of

the educational process. The proposed purchase represents a significant investment in the future

success of the college as well as individual students. While the specifics involved in the process

of evaluating, choosing, and purchasing technology for a Culinary Arts program will vary

slightly among different institutions, the information presented here should be a useful guide to

the process in general.

APPENDIX

Interview questions:

1. What technology do you use in the front of the house?

2. What technology do you use in the back of the house?

3. How do the technologies interact?

4. How current is the technology that you are presently using?   Do you anticipate any new purchases or- upgrades to your technology in the near future?

5. How does the use of technology affect your operating efficiency?

6. When you consider an applicant what technology training and experience is most desirable to you as an employer? How much does that training and experience affect your hiring decision?

7. How do you see technology affecting our industry over the next 2 -5 years?

8. What do you think is the most important technological skill we should teach culinary art students?

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