# Best Practices in Career Education:

# Technology Drives Changes in Student Advising

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**Abstract**

The exponential growth of technology-dependent careers is changing the landscape of future occupations for students today. The impact of this phenomenon has been felt in both the professions and in the trades. New technologies are changing access to information causing a shift in the configuration of the professions. Technology is also creating jobs never before imagined in human history. While the career landscape explodes with new opportunities, student career advising has remained stagnant and largely unchanged. A new, expanded framework is needed. Instead of focusing the search for the fitting job using trial and error or preference tests, students should be coached to concurrently look at their personal interests and skills, and then be referred to data on projected job demand as created by the rise in technology. Students need to be given access to information about the future demand of industries that will help them make decisions and find educational pathways that will lead to higher wage jobs. Predictions for job growth and demand for specific occupations are readily available. The guidance that follows a firm foundation driven by future employment realities will result in better career choices and avoidance of the potential pitfalls of uninformed searches, unfruitful exploration, and mismatched results.

**Keywords:** career advising, new technologies, technology and jobs, high school guidance, best practices

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## Career Advising: The Status Quo

Twelve years ago I began working with high school students, helping them figure out "what they wanted to be when they grew up." As a career education teacher, I followed standard practices as I led a student into self examination through the use of preference tests which identified personal interest skills and values (Wiltshire-Bridle, 2013). Next, I encouraged the student to match those traits to a variety of occupations that were in some fashion a fit. When a feasible career choice was selected, the best programs and schools to meet educational goals were identified. Finally, a plan for paying was put in place. The practice of guiding students to find future careers has remained essentially the same for decades.

Over the past fifteen years, however, the impact of technology in the workplace has rendered those common career guidance practices, incomplete and therefore ineffective. Significant changes must be made in the way students are advised as they evaluate future career pathways. If students are to be adequately prepared for future careers, it is imperative that they be coached to carefully assess the impact of technology on future jobs in order to make informed choices.

## Employment: Current Realities

We now stare at some sobering realities: "More than half of Americans under the age of 25 who have a bachelor's degree are either unemployed or underemployed" (Hendrickson, 2012). Since 2008, underemployment of college grads has risen from 35% to 44% (Bowyer, 2014). Due largely to the exponential increase in information technology, those professions that

most often require a bachelor's degree or better are poised to experience a huge technology-induced transformation (Susskind & Susskind, p. 9). Additionally, in the near future a significant shortage of skilled technical workers looms large. So also, a deficit of skilled workers in the trades will mushroom in the coming years (Wright, 2013).

## Contributing Factors

How did our traditional career advising produce the present imbalances in regards to the number of graduates and market needs? Over the past decade or so, high school career guidance has favored occupations which often required at least a four-year degree. After all, teachers and counselors doing the advising had themselves followed a four-year track, so they felt competent and comfortable in directing students in that direction. In addition, this higher-ed focus was fueled by charts such as ones in The Economics Daily published by the Bureau of Labor and Industry (2015), relating how an increase in years of education directly corresponded to a decreased rate of unemployment and increased salaries. But without accounting for the low market need for higher degrees, and without accounting for the demand in jobs with just some technical training, this advising was woefully misguided.

## A Bias

A college-for-all perspective morphed into an over emphasis on university education -- a "university-for-all mentality" (Fleming, 2013). As this four-year-school mentality persisted, an accompanying anti-blue-collar bias developed, and high school graduates were directed away from pursuing trades in favor of four year educational paths. However, four year degrees do not always translate to jobs. Degrees in anthropology, psychology and political science do not produce students poised to step into the jobs that are available; additional education is necessary.

Master's and professional degrees do lead to concrete careers such as law, accounting, architecture and medicine, but the job market demands for these degrees is limited and this relatively static demand was not part of the average career guidance equation.

## Aligning Career Advising to the Job Market

Job market information has been available for decades. In 1950, approximately two out of ten jobs required a bachelor's degree or better; two out of ten jobs were considered skilled and six out of ten were classified as unskilled (Fleming, 2013). In 2013, the number of jobs requiring a bachelor's or better has shifted only slightly from two to three out of every ten jobs. There has been a significant decrease in the need for unskilled labor, largely due to outsourcing overseas. High-paying, low-skill jobs are now filled by foreign workers who are paid significantly lower wages. In the U.S. then, that demand for unskilled workers has been replaced by the demand for skilled workers with some type of tech-related skills and/or training. Now, nearly seven out of ten jobs require some type of certification or technical education.

## Consequences

Not addressing this shift, high school career advisors have continued to steer students towards four year degrees. Thus, the job market for four year (and above) degrees has become oversaturated (Fleming, 2013). Unemployment and underemployment for university graduates has risen since the 2008 recession. For example, last year only 60% of law school graduates become employed in their profession after graduation (Hansen, 2015).

For the past decade, career educators have not understood how advances in technology across all employment sectors, were radically altering the landscape. According to Huffpost writer Daniel Kendall (2014), the job market has been significantly impacted by technological

innovation. New digital tools and processes have turned the professions as well as high demand career areas like manufacturing and trades, on end. The result has been the realigning of jobs in the professions and the creation of a plethora of new positions which demand some type of technical training.

## Employment in The Professions Affected

Students heading into the professions today need to know, more than ever, how technology has and will impact the professional occupations. According to Richard and Daniel Susskind (2015) the "exponential growth in information technology, the increasingly capable machines, the increasingly pervasive devices, and the increasingly connected humans," (p. 155) will radically alter the way professionals do business in society. This means changes in, for example, exclusivity of information, a critical component of professional employment and income generating power. Due to the increase of information sharing on the internet, access to "privileged" information traditionally available only to members of the professions is just now a mouse click away from the masses. Whereas in the past, having a will drawn up was handled exclusively by a lawyer, the internet is now replete with legal sites that offer do-it-yourself documents and step-by-step instructions on how to draw up a will. Legal professionals no longer have the corner on the market.

This effect of technology has also caused a new stratification of jobs in the professions. In the field of medicine, where technology has expanded expensive treatments and services, increasing medical costs, new para-physician occupations like physician assistant and nurse practitioner have been able to more economically handle some of the lower skill duties of doctors. This has in turn caused a need for doctors to specialize, requiring additional training.

Similarly, in the field of tax preparation, companies like H&R Block now dominate the market of preparing simple tax returns, some of which were formerly handled by accountants and tax professionals. Much of the work done at H&R Block is handled by computer programs which automatically figure out the tax liability for clients, eliminating computational errors. This automation of lower level tax jobs has forced the professionals to focus on the more complex tax preparation jobs.

Students pursuing four year degrees will find a significantly different professional environment as they begin their careers and should consider the implications technology has had and will have, on their future profession. They should also be advised about alternative career choices within each profession that will produce adequate, even excellent incomes and lifestyles. Instead of obtaining a medical degree, advances in technology means students can elect to pursue a plethora of other technical medical degrees, some requiring a bachelor's but many requiring an associate's degree or less.

These new technical degrees yield a family wage. For example, a Polysomnographic (Sleep Study) Technologist requires just nine months of training and has a median annual salary of over $52,000 a year. Therefore, students graduating from high school must understand how technology has reset the game for the professions and created a stratification of high wage career choices than ever before.

## Effects on the Trades

Similarly, traditional occupations like the trades, have undergone multiple tech-related changes, all of which affect future jobs. Carpet layers work with new space age adhesives, crane operators run sophisticated computerized machines, and automotive repairers use complex

diagnostics on today's computer-enriched cars. Trades now require math skills equivalent to those needed to enter a four-year university, and the trades themselves require specialized technical training. Both high performing students and those students who are inclined to hands-on employment, should be encouraged to consider pursuing the trades. Becoming an electrician, a welder or a machinist is a desirable choice, particularly when comparing salary, length of education required, and the risk of a huge debt load that may accompany a four year degree.

## Manufacturing Changes

In manufacturing, new technology has shifted business strategies, allowing for customization of products and increased productivity. New technology has augmented and extended human efficiency, reducing the number of workers needed and raising the technical skill levels needed by those remaining (Bartell, et al., 2007). Brand new systems are being put in place and trained workers must operate the new technology.

Not only have human industrial efforts been augmented, but advanced industrial manufacturing technology and robotics are poised to produce factories where the human worker is eliminated altogether. "Lights out manufacturing" is the name for a process which produces goods without people, (Markoff, p. 65). Outside of Amsterdam, the Phillips company has built an assembly line of automated robot arms which produced 1,304,000 electric shavers a month (Markoff, p. 67), with virtually no human labor.

This trend is both good news and bad news for high school students. While the demand for skilled STEM graduates to create the technology used to automate production will be high, the bad news is that these innovations could very well decrease the number of future jobs. Any

jobs that remain will be those that require some kind of technical training, and STEM jobs that require extensive 4-5 year degrees.

## The Future

In addition to technology driven changes to the professions, manufacturing, and the trades, students must understand that there will continue to be completely new fields and industries produced by cutting edge technology. According to techno-optimist Ray Kurzweil (2005) the futuristic fields of genetics, nanotechnology and robotics are ushering in Epoch Five, the merger of human technology and human intelligence on the way to The Singularity (p. 205) where people and machines merge. STEM and technical jobs spawned by Intelligence Augmentation and Artificial Intelligence will follow advancements in those three critical areas.

## Changes in Career Advising Practices

The work of career educators has never been more important. Staying connected to business and industry, staying current with the effects of technology at every level, and re-establishing best practices in how students are advised is critical. Career advisors who keep up with technology in the workplace will remain relevant and effective in helping students form future-ready career goals. Educators must discern the impact and implications of the technology revolution and convert that analysis into efficient and effective practices that guide students forward into their futures. The old preference test, occupation match, school selection, financing option pathway must be reconstructed and modernized.

### Acknowledge the Impact of Technology

Career advising at the secondary level needs to be reassessed and reset. First, students must know that technology has reshaped their future career choices at every employment sector.

The careers reached by way of a four-year education have been transformed. Today and into the future for which we are preparing students, seven out of ten jobs will require some kind of technical training or certification (Fleming, 2013). Knowing this need for workers with some type of certification or technical training (including apprenticeships) can be a game changer for students trying to figure out the next best step. The future for STEM and technology jobs will continue to be golden as a result of brand new technologies we have not even imagined.

## Provide Current Relevant Data

Students who base their career decisions on solid data will move forward on firm ground. Rather than depending on the familiar preference tests, students should be steered to information about job market projections and future job growth. The increase in information technology means that reliable data is readily available on the current hottest jobs and future job growth projections. Additionally, searches can easily be customized: “The 100 Best Jobs” and “The Ten Hardest Jobs to Fill” are but two of the many specific lists students can use for direction.

## Encourage Steps Beyond Preference Assessments

Career guidance counselors should still encourage students to take preference assessments and students can be directed to any of the many skills assessments, interest inventories and work importance locators. For example, the Interest Profiler on the Career Information System of the University of Oregon, a comprehensive research site, identifies a student’s Holland Codes, a common tool that matches interests with occupations. Students can verify the career suggestions generated by these assessment results and do further exploration. It should be emphasized; however, that no assessment is predictive, or tells a student what they should be. They are, rather, suggestive, giving a student relevant possibilities to choose from.

They are just the initial platform from which to leap into understanding of the future employment possibilities.

Making students aware of broad Career Learning Areas is also helpful. Students can identify a group of occupations that are appealing to them and then narrow down to more specific possibilities. The key is to always treat results with a loose approach: informative rather than predictive.

## Merge Job Projection Data with Preferences

With job projection data and personal preferences a student can identify several promising jobs they should consider. At this point, more in depth research can be beneficial. Two occupations can be compared and a cost benefit analysis can be done. It is also helpful to identify any biases that the student, or the advisor, may have. Are high performing students being urged towards a four-year degree or are they encouraged to consider apprenticeships? Are lower performing students being directed towards the trades or encouraged to step up to challenges? Are females being directed away from the trades? The future is open to all students, and both they and their advisors need to recognize all occupations as possibilities.

## Research Educational Options

Educational pathways should also be evaluated. In 1968, Ray Kurzweil created what was most likely the first computer program to match a high school student to a college (Beck, 1970. p.2). The Select program consisted of 300 questions tied to a (then) huge database with information on three thousand colleges (p. 497). The cost was fifteen dollars (mid-range) and against eight other similar services, Select was rated “Good” (Beck, 1970).

Today technology powers a variety of similar sites offering college matching services to students. Big Future, a part of The College Board, is simple tool to use. It allows any student to enter personal preferences in a number of different fields, (Big Future). College choices are generated from mega databases by sophisticated algorithms. Students should be encouraged to try a college-matching site to check out the yield and to contemplate all the variables in choosing a school. At the same, there are other ways of gaining a job-related education. Employer-paid, on-the-job education or the military may be relevant options of which a student may not be aware.

**Provide a Realistic Overview of Education Financing**

Two thirds of today's college graduates finish their education owing an average of thirty-five thousand dollars (Kantrowitz, 2016). In an opinion piece for *Forbes,* Chris Bowyer (2014) noted, a distressing one out of five of college graduates who leave school with debt eventually abandon the line of work they prepared for, in order to get an unrelated but better paying job to help meet their loan obligations (2014). In response to the student debt crisis, financing for college education is changing rapidly. The game changing rollout of The Oregon Promise these past two years, attests to the recognition that the increase in college debt has been out of control and the State of Oregon's determination to address that problem. The Oregon Promise offers 90 hours of free community college tuition to students with a year of Oregon residency and a 2.5 GPA. Students need good information about these changes in sources of funding in order to make informed decisions about money. Also, counseling in regards to taking out loans is imperative so that students know the risks and responsibilities of educational debt so

they can avoid the pitfalls. Finally, learning how to create a budget for college is a must if students are to be adequately prepared to take on the adult responsibilities of school debt..

## Couch the Quest in Relative Terms

Finally, the entire quest for a future career should not be an "all or nothing" proposition. Students should understand the option of scaffolding careers: beginning employment with a technical job that pays well and then, after gaining experience in a field, advancing to occupations with higher education requirements. Students today will have on average anywhere from 12 to 15 jobs during their lifetime (Marker, 2015). They should be encouraged to find the "next step" as opposed to being faced with the question, "What do I want to do with the rest of my life?" Breaking the decision down to a shorter period of time may alleviate some of the anxiety associated with the many post-high school career decision making.

## Career and College Related Learning Experiences

Even though high school career guidance needs much updating, a few things remain tried and true. College visitations, job shadowing, informational interviewing, and college and career fairs remain productive investments of students' time. Besides a good understanding of job market data, career counselors should set up multiple opportunities for students to interact with folks in business and industry. There is no substitute for the real life wisdom that people in the work world can offer a student. Those connections combined a good understanding of the future demand for jobs will equip students to move forward.

## Transferrable Skills

Regardless of the career direction, emphasis on transferable and soft skills also remains a best practice. Personal management, problem solving, communication, and teamwork will never

be out of demand. Showing up with a good attitude and following directions as well as having the ability to think creatively, will always be prized by employers. Advisors who couple those skills along with an understanding of how technology will drive future job choices, will be providing quality advising to support all student's quest for employment success.

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