



Part 1

Skills Mismatch

Connecting Classroom and Career: Advancing
Success through Skills Alignment

If a degree program doesn't prepare graduates for careers related to their major, then something fundamental has gone wrong.

A clearer understanding about which skills and majors make the best-aligned transitions from school to work can enable better decisions about preparing students for the labor market and position education institutions for future success.

Lightcast data can show where the skills needed and skills taught line up and where they don't, using an innovative index that measures the mismatch between majors and labor demand. We used millions of social profiles and job postings to create an index that captures the mismatch, which comes from both skills misalignment and misalignment in career trajectories.

Analyzing the difference between the skills taught at education institutions and the skills requested by employers can give both students and institutions the clearest possible understanding of where the gaps are—and where they can be bridged.

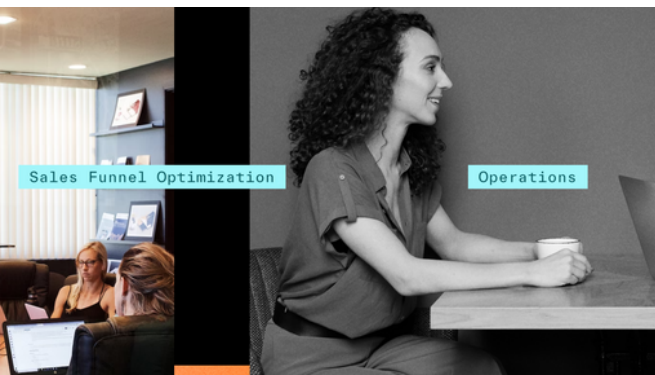
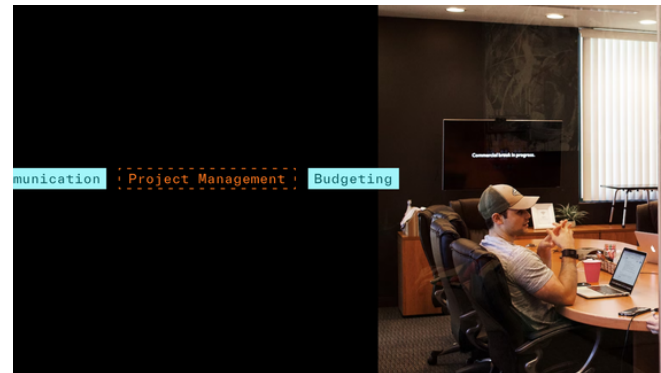
This is the first in a series of reports on mismatched skills, with the others covering implications for employers and communities. Below, the series begins with what this difference means for education.

The Skills Alignment Score and Key Findings

We developed the Skills Alignment Score (SAS), which measures the alignment between majors and labor demand. We used 1.4 million profiles and 10.8 million job postings to create an index that captures the alignment, which comes from matching skills to career trajectories. Here's what we found:

Skill Alignment Matters

Students whose majors teach skills aligned with labor market needs are less likely to be underemployed. A major that is 20% more aligned with the labor market has graduates who are 10% less likely to be underemployed.



The Majors to Jobs Connection

Almost a fifth of bachelor's degree graduates enter the job market in occupations not related to their major, highlighting the need for institutions to make clear how their courses connect to employment opportunities (and the opportunity to help alumni make those connections).

Careers Align with Unexpected Degrees

While majors generally match with careers in their own fields, there are some cases in which students with a certain degree actually align better with occupations related to another major—including technical engineering jobs, for which Computer and Information Science graduates have the most relevant skill sets.



Defining Alignment

Broadly speaking, education and employment can be misaligned in three ways:

- 1** Difference in the skills taught in a program and those needed in related occupations
- 2** Difference in the number of graduates from a program and the number of openings for those types of graduates
- 3** Difference between the majors students study and the careers they actually pursue (e.g. electrical engineers going into software development)

It's worth noting there are also several important aspects of the overall education experience that can't be understood by studying alignment—labor market outcomes aren't the only reason someone would pursue an education. And if a student were to pursue a degree in something like multidisciplinary studies, their skill set could be quite broad, but would also be difficult to define in relation to their degree.

But those cases don't detract from the overall value of studying the mismatched relationship between degrees and career outcomes. The more everyone understands about labor market success, the better prepared everyone is to create it—including educators, employers, and community leaders.

Matched / Mismatched Majors

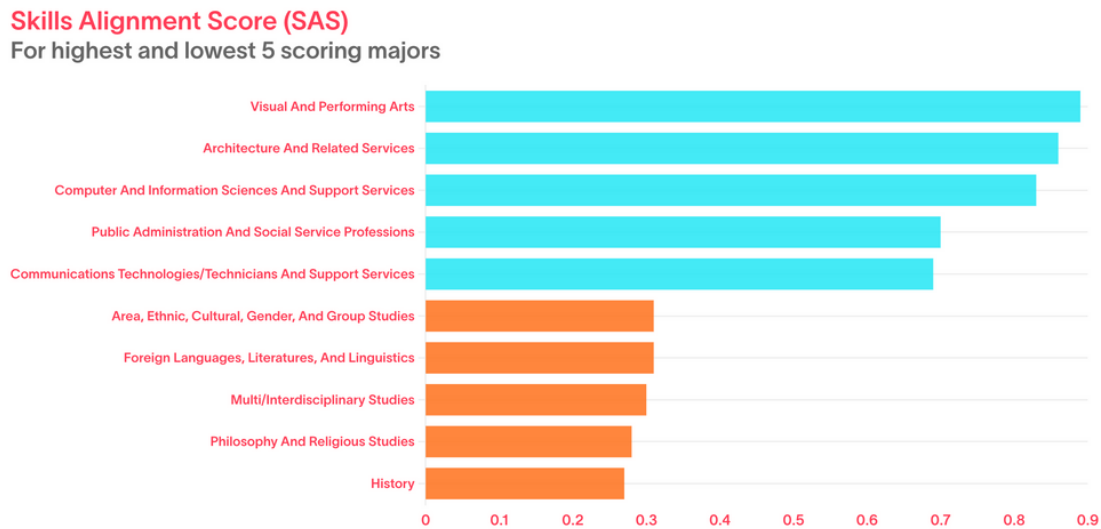
Using the criteria above, the top most-aligned majors are:

1. Visual and Performing Arts (SAS 0.89)
2. Architecture and Related Services (SAS 0.86)
3. Computer and Information Sciences and Support Services (SAS 0.83)

While the least aligned are:

1. History (SAS 0.27)
2. Philosophy and Religious Studies (SAS 0.28)
3. Multidisciplinary Studies (SAS 0.3)

Figure 1.
Skills Alignment Scores (SAS)
 For highest and lowest 5 scoring majors



Source: Lightcast

[See the full data](#)

At times, prevailing narratives suggest that technical and STEM-related careers prepare students well for the labor market, while those in the arts do not. But the SAS provides a counterpoint: the highest-scoring major is Visual and Performing Arts.

Perhaps the better rule of thumb is that specific majors provide better alignment than more general ones. Each of the top-scoring majors are in fields that offer clear career paths; workers in the industries of the performing arts, architecture, or computer science are all very likely to use skills they learned in school.

By contrast, the majors that score lower are those that are more general. Courses in Philosophy and History teach students skills that are broadly applicable to many fields, even though few ultimately go into work as a philosopher or historian.

Which Majors Map to Other Fields

While most majors typically match best with their own related occupations, the level of match can vary greatly. In some cases, the skills that students from a particular major have are better aligned with skills requested by occupations for another major.

For example, the skills requested in job postings for Engineering Technologies and Engineering Related Fields are better aligned with the skills of Computer and Information Science graduates than Engineering technologies graduates. Students with majors in STEM and liberal arts tend to be more similar to others in the same category.

Some majors, such as Education, Public Administration, and Family and Consumer Sciences, open the door to a wide variety of potential job fields; students from those majors have skills that match well with a wide variety of job postings. For example, students majoring in Education are quite qualified for jobs in Education, but they can also pursue jobs in the fields of History, Foreign Languages and Literature, or the Liberal Arts, just to name a few.

On the other hand, jobs in Visual and Performing Arts, Communications, and English Language and Literature match well with students from a wide variety of majors. As an example, qualified students for Visual and Performing Arts jobs can come from not only Visual and Performing Arts majors but also Communications, English Language, or Philosophy majors.

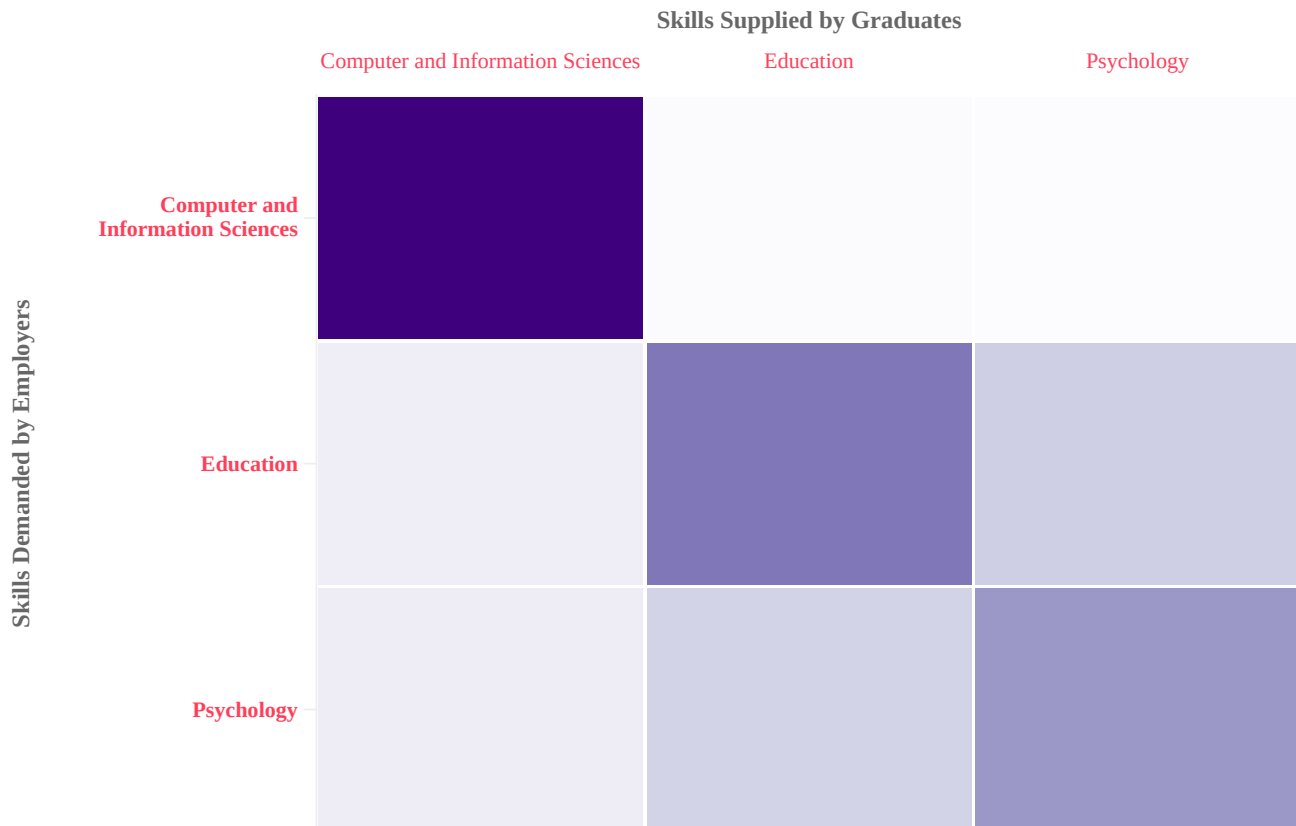
Unsurprisingly, Computer Science jobs match very poorly with most non-STEM majors. However, the Skills Alignment Score shows one notable exception: Foreign Language graduates have a surprisingly high alignment with Computer Science jobs when compared to other majors in the field of social science, perhaps suggesting that the skills needed to learn programming languages and foreign languages are somewhat similar.

We also found that many jobs and skill requirements are tangential to their associated majors. The top occupations for Biology majors, for example, are Physical Scientist, Elementary School Teacher, Chemical Technician, Project Manager, and Medical Technologist. "Biologist" and related titles are conspicuously absent, likely because those kinds of occupations require a graduate degree. We see a similar pattern for Math majors, where three of the top five occupations are for teachers at the high school level or below.

This chart details the alignment between three distinct majors. To see the full data set, including over 30 majors and their scores overlaid, visit our [SAS Full Data page](#).

Figure 2.
Skills Alignment Scores
Between different majors

Skills Alignment Score 0  1



To view the complete data set, in an interactive chart, scan:



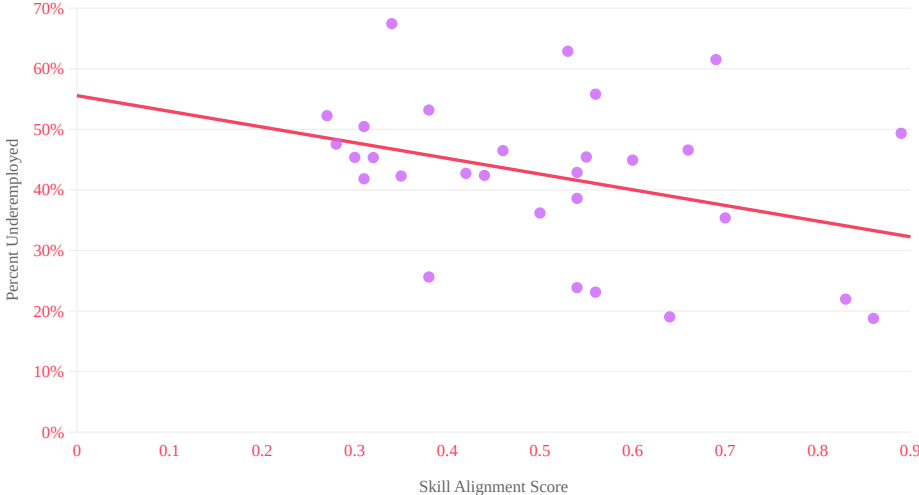
Misalignment and Underemployment

The Skills Alignment Score, and the relationship it represents between what education institutions provide and what employers request, shows how educators can capitalize on programs that do well and work toward optimizing those that show a mismatch. Providing students with skills they need and can use to get a job in their field is an invaluable resource to help graduates achieve labor market success.

One of the greatest threats to that success is underemployment—that is, having earned a bachelor’s degree but working in a role that does not require one. Those who are underemployed in their first job are five times more likely to be underemployed five years later as compared to their counterparts. Even at the 10-year mark, three-quarters of workers who were underemployed at year five remained underemployed. By contrast, those who have a first job appropriate to their background almost never fall into underemployment.

The stakes are even higher in situations where underemployment is statistically more likely. Women are significantly more likely to be underemployed in their first job, and the data show they find it more difficult to escape underemployment regardless of their college major. Underemployed recent graduates, on average, earn \$10,000 less annually than graduates working in traditional college-level jobs. This effect compounds since underemployed workers are more likely to continue being underemployed.

Figure 3.
Majors With a Higher Skills Alignment Score Are Less Likely to Have Underemployed Graduates



Source: Lightcast

The Skills Alignment Score is negatively correlated with underemployment, meaning that the more aligned a major is, the less likely it is that graduates from that major will be underemployed. The average major has a Skills Alignment Score of 0.51. Moving to a major that is 20% more aligned with the labor market leads to graduates who are 10% less likely to be underemployed.

For example, Philosophy and Religious Studies has a Skills Alignment Score of 0.28 and 48% of graduates are underemployed. Similarly, History has a 0.27 Skills Alignment Score and 52% of graduates underemployed.

Conversely, Architecture and Related Services has a Skills Alignment Score of 0.86 and only 19% of graduates are underemployed; Computer And Information Sciences And Support Services has a 0.83 Skills Alignment Score and 22% of graduates underemployed.

At the same time, underemployment has multiple causes. It is possible for a program to be well-aligned to the labor market, but still leading to jobs that do not necessarily require a bachelor's degree. All of this underscores the need for well-aligned, skills-based programs that connect with employer's demands.



Sales Funnel Optimization

Communication

Project Management

Budgeting



SAS Methodology

The Skills Alignment Score (SAS) is a metric created by Lightcast that shows the degree of similarity between the skills that schools are teaching and the skills that are requested in relevant job postings. We narrowed our analysis to students who graduated between 2019 and 2021. Our assumption was that the skills listed in those profiles would most likely have been learned in school (since they have not had much time to learn new ones through work experiences). This gave us close to 1.5 million profiles to work with.

For each major, we created a measure of skill recall rates by calculating the percentage of worker profiles that list a given skill. In other words, we identified the supply of top skills for each major based on the skills its recent graduates listed on their profiles. The more graduates that list a certain skill, the greater its **supply** in the labor market.

New Graduates from Social Profiles Data

| Student | Major | Skills |
|---------|----------------------------|--|
| 1 | Visual and Performing Arts | Adobe Photoshop, Photography, Graphic Design, etc. |
| 2 | Visual and Performing Arts | Marketing, Adobe Illustrator, Branding, etc. |
| 3 | Visual and Performing Arts | Logo Design, Adobe Photoshop, Marketing, Adobe Illustrator |

Top Skills by Major in Social Profiles Data

| Top Skills in Visual and Performing Arts Profiles | Recall |
|---|--------|
| Adobe Photoshop | 28% |
| Marketing | 25% |
| Graphic Design | 25% |
| Adobe Illustrator | 22% |
| Photography | 17% |



To see where students from each major became employed, we used data from the American Community Survey, which gave us the top five most common occupations for each major. Then we applied the Lightcast library of job postings data to create a vector identifying **demand** based on the top skills requested for those occupations in 2021.

Top Occs by Major from ACS

| Top Occs in Visual and Performing Arts |
|--|
| Graphic Designer |
| Elementary School Teacher |
| Interior Designer |
| Producer |
| Art Director |



Top Skills for Top Occs

| Top Skills for Top Occs in Visual and Performing Arts | Recall |
|---|--------|
| Adobe Photoshop | 38% |
| Graphic Design | 36% |
| Adobe Illustrator | 36% |
| Adobe InDesign | 28% |
| Marketing | 28% |

[See the full data](#)



Conclusion

In the college classroom, students learn new ideas and skills so they're capable of taking steps that will help them succeed throughout their careers and lives. The more students can learn, the better prepared they will be for making decisions that will lead toward future success.

The same principle applies here: more information and analysis in sharper detail leads to a better understanding of skills alignment, and how it plays out across majors and regions. And this lays the foundation for improved strategies to help guide graduate success.

Information itself must be a crucial part of those strategies: students and prospects need to know how their time at school will connect to their time after it. If an institution can articulate how well its degree programs lead to affiliated jobs, that institution will be at an advantage. If it can show which majors open up a wide range of employment possibilities, or, on the other hand, which jobs are accessible to students coming from several majors, that, too, is meaningful. Having the answers provides value.

By matching the skills taught to the skills requested, higher education institutions can quantify and celebrate their program's success, reduce underemployment and improve outcomes for graduates, and unlock success for everyone—from classroom to career.



ABOUT LIGHTCAST

Lightcast provides trusted global labor market data, analytics, and expert guidance that empowers communities, corporations, and learning providers to make informed decisions and navigate the increasingly complex world of work. With a database of more than one billion job postings and career profiles, our team provides best-in-class customer service with robust data, clear analysis, and expert guidance on skills, jobs, and opportunities.

Headquartered in Boston, Massachusetts, and Moscow, Idaho, Lightcast is active in more than 30 countries and has offices in the United Kingdom, Italy, New Zealand, Canada, and India. The company is backed by global private equity leader KKR.

For more, visit lightcast.io

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