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Employability versus Passion for Basic Sciences: Career Paths of Biology Graduates After Getting Higher Education Diploma

İstihdam Edilmek mi Yoksa Temel Bilim Tutkusu mu? Biyoloji Mezunlarının Yükseköğretim Diploması Aldıktan Sonraki Kariyer Yaşantıları

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ABSTRACT

Manufacturing high-profit goods in the information and technology age requires solid foundations in basic sciences. However, despite their interests and high success, basic sciences often fail to attract university candidates due to the perceived job insecurity after graduation. To challenge this notion, the current study aimed to examine biology graduates' profiles and career life. As a survey study, an online questionnaire was administered to 56 graduates of the biological sciences department. The findings showed that almost all graduates chose biology due to their interest in the first place. The majority thought that their undergraduate education prepared them effectively for their future career, and they acquired 21st-century skills adequately, except for entrepreneurship skills. They found a job related to their major in one to two years. They were primarily employed in universities and got academic positions. They were satisfied with their jobs. The study concluded that higher education attains its aim to match passionate people in line with their interests; however, it still needs to update curricula considering current knowledge, skills, and competencies. The implications may encourage university candidates to follow their passion in pursuing a career in basic sciences, particularly in Biology.

Keywords: Higher education, Basic sciences, Biology graduates, Career choice, Employability

ÖZ

Bilgi ve teknoloji çağında kârı yüksek mallar üretebilmek için temel bilimlerde sağlam temellere sahip olmak gereklidir. Ancak, bazı üniversite adayları genellikle mezuniyet sonrası iş güvencesizliği yaşayacakları düşüncesiyle ilgi duymalarına ve bu alanlarda yüksek başarı göstermelerine rağmen, temel bilimlerle ilgili alanları tercih etmemektedirler. Mevcut çalışma, bahsedilen bu durumu daha yakından incelemek amacıyla biyoloji mezunlarının profillerini ve kariyer yaşantılarını incelemeyi amaçlamaktadır. Tarama çalışması

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olarak tasarlanan çalışmada biyolojik bilimler bölümünden 56 mezuna çevrimiçi anket uygulanmıştır. Bulgular hemen hemen tüm mezunların biyolojiyi ilk etapta ilgilerinden dolayı seçtiklerini göstermiştir. Mezunların çoğunluğu aldıkları lisans eğitiminin onları gelecekteki kariyerleri için etkili bir şekilde hazırladığını ve girişimcilik becerileri dışında, 21. yüzyıl becerilerini yeterince kazandıklarını düşünmektedir. Mezunlar bir ila iki yıl içinde mezuniyet alanlarıyla ilgili özellikle üniversitelerde akademik pozisyonlarda iş bulmuşlardır ve çalıştıkları işlerinden memnunlardır. Çalışmada, yükseköğretimin insanları ilgi alanları doğrultusunda alan ve mesleklerle eşleştirme konusundaki amacına ulaştığı sonucuna varılmıştır; ancak yine de günümüzdeki ihtiyaç duyulan bilgi, beceri ve yetkinlikler göz önünde bulundurarak yükseköğretim programlarının güncellenmesi gerekmektedir. Sonuçlar, üniversite adaylarını temel bilimlerde, özellikle Biyoloji alanında kariyer yapma tutkularının peşinden gitmeye teşvik edebilir.

Anahtar Sözcükler: Yükseköğretim, Temel bilimler, Biyoloji mezunları, Kariyer seçimi, İstihdam edilebilirlik

INTRODUCTION

Higher education is essential for a country to train an educated workforce who can sustainably produce high-profit goods. Higher education, also called college or university education, covers the period after secondary education. In contrast to secondary education, it is voluntary and leads to specialization. Higher education aims to align people's interests and abilities with their discipline to generate people with the needed knowledge, skills, and behaviors (Law of Higher Education, 1981). Choosing the right career path has a considerable effect on people's life satisfaction (Jiang et al., 2017; Sari, 2019). Within this respect, career choice might become a milestone for many young people, and career search generally starts in high school years.

High school students choose their discipline depending on various factors. The studies suggested that students choose their department considering future employment, career opportunities, intellectual challenge (Aksu et al., 2010; Glynn et al., 2009; Obayelu & Fadele, 2019), their past experiences (Kass & Miller, 2018), their passion, university exam scores (Aksu et al., 2010), family pressure (Kabil et al., 2018), and practical knowledge in the subject area (Obayelu & Fadele, 2019). All these factors can fall into two categories according to the source of motivation; intrinsic ones such as the opportunity to help others, especially in disciplines such as medicine (Kass & Miller, 2018), genuine interest in the subject (Lucrezi et al., 2018; Wang, 2013) and extrinsic ones such as the public prestige of the job (Skatova & Ferguson, 2014), job security, and wage (Glynn et al., 2009), work conditions, and workload (Author., 2021). However, people's intrinsic motivation is also affected by outside sources. While choosing a program to study, high school students are generally influenced by people in their environment, notably from their teachers in high school or family members (Bahar & Adiguzel, 2016; DeWitt et al., 2019; Malgwi et al., 2005), or they consider the economy of the country.

At this point, economic instability in a country might lead to the prioritization of extrinsic factors over that of intrinsic factors. In a fluctuating job market, the graduates are urged to develop the needed knowledge, skills, and competencies to survive and higher education institutions are urged to produce 'employable' graduates (Moreau & Leathwood, 2006). Accordingly, labor receives lower wages than in the past, especially for the less educated, so job security and salaries are prioritized in selecting the future career (Ko & Jun, 2015; Lee & Choi, 2013). Moreover, as might be expected, low financial status was correlated with prioritizing monetary gains for selecting the career (Grayson et al., 2012; Wong et al., 2017). On the other hand, estimating the job potential of a discipline in the next five years in a rapidly changing world is complicated. For some professions such as medicine, income by the career path can accurately be determined by students and affect their career choice (Morra et al., 2009). Still, this estimation might be more difficult for other areas such as basic sciences, where jobs and research are more directly affected by the economic conditions. It is even more difficult in the absence of concrete data (Kulcsár et al., 2020), such as the graduates performance in finding jobs.

Some universities responded to the efforts of college applicants to find out more about job opportunities. In recent years, this response has included providing free services related to career counseling (Winters et al., 2018). Nearly all universities in Europe and the US have career counseling centers, offices, or networks to guide their students for their future professions regarding the conditions of the country and world, their motivations, concerns, and abilities. In 1980, one of the universities in Turkey built the first employment office, the earlier versions of Career Planning Application and Research Centers (Gülmez & Okur, 2021; Karaaslan, 2017). Such centers have spreaded to every university in Turkey after being forced by law in 2018 (Erdogan, 2018). Another response is to create a better network with the graduates. Reconnecting with the graduates provides the possibility to examine how successful the graduates are in securing high-quality jobs and the needed knowledge, skills, and competencies in the work-life. Analyzing biology graduates employment has never been conducted systematically until recently (Erkut, 2015). A recent approach to answering the demand is called Üni-Veri. Under the Türkiye, the Human Resources Office carried out this project. The office profiled all Turkish people that graduated between 2014 and 2019 from a Turkish University using certain variables such as length of finding a position and starting salary (TCCMB Human Resources Office, 2022).

Career In Biology as a Basic Science

Students choose basic sciences primarily due to their interests and passions since students seeking status or wealth follow areas that may offer more accessible paths to these ends. Basic

sciences require a lot of intelligence (Selvaratnam & Mavuso, 2010), and most students who go into them like to think, study, and solve scientific problems (Heo, 2008; Yoon & Pak, 2003). Therefore, they might have an apt solid to follow academic life. People with less passion for science are more likely to change careers after graduation due to the considerably higher requirements of academia in the basic sciences, such as harsh work-life balance (Lindfelt et al., 2018; Yamazaki et al., 2017). In such cases, students with a biology degree can pursue a career in more applied fields, such as health (Araneo et al., 2017). In summary, students choose basic science primarily due to intrinsic factors, but they also possess opportunities to switch areas offering better job security.

For developing and underdeveloped countries, basic sectors such as agriculture, aquaculture, and animal husbandry call for help for biology graduates as they face serious problems that lead to the inefficient use of vast natural resources. Therefore, such countries should offer immense potential to biology graduates. As a result, developing countries encourage biology graduates to take on these challenges as entrepreneurs (OC Ejilibe & 2012, 2012). However, biology graduates require training in entrepreneurial skills and the development of a clear, determined vision beginning in their undergraduate years (Jie et al., 2021). Developing countries will require better-trained biologists in entrepreneurship areas as they increase interaction with the developed countries, for example, Turkey through integration into European Union or Pakistan through China Pakistan Economic Corridor (Shahid et al., 2019).

People who want to go to college but are interested in biology may not follow their passion because they are worried about finding a job after they graduate. Even though these students tend to prioritize "meaning" to "income" regarding what they expect from their future professions, they might be intimidated by the zeitgeist about how tough it is to obtain a job after graduating from biological sciences. Previous studies confirmed that the unemployment rate was higher in basic sciences (biological sciences and physics together, 16.9%) than that of, for example, engineering. In engineering, the rate was 10.3% (TUIK, 2020). According to Üni-Veri, although 65.6 % of biology graduates found jobs in one year, 46.7 % of them were employed related to biology, and this percentage is lower than the other fields such as teaching, engineering, dentistry, and medicine (TCCMB Human Resources Office, 2022). These rates provided evidence for students' concerns over employability, translating into students' avoidance of biological sciences.

Accordingly, job security might be the main deterrent factor for students to choose biology departments (Özçelik et al., 2014). The studies confirmed that the highest-scoring students' tendency to select disciplines shifted from biology to engineering and medical sciences due to employability concerns (Akgunduz, 2016; Günay et al., 2013). On the other hand, the statistics provide employment rates based on which discipline people graduated from, and the findings showed that the rate of biology and related sciences is 67.7% in 2020, which is higher than the average of other areas but lower than engineering and medical sciences (TUIK, 2020).

As researchers, despite these findings, we hypothesized that highly qualified students find good jobs even in areas where the general employment rate is low. The literature overwhelmingly underlines that the job opportunities and wages tremendously increase for the skilled ones (Abbas & Sagsan, 2020). Therefore, to challenge the prevalent perception about biological sciences, we assume that even if a biology major offers fewer job opportunities than other popular disciplines, the best educated should not have difficulty finding decent jobs. The quality of higher education affects employability. Within this respect, we examined the profile and career life of biology graduates from one of the most renowned universities of Turkey. The findings may encourage university candidates to follow their passion in pursuing a career in biological sciences and also urge the decision makers to update the current higher education curricula.

METHOD

To understand the profile and career paths of biology graduates, survey research was designed. According to literature (Fraenkel, Jack R., Wallen, 2009), "the major purpose of surveys is to describe the characteristics of a population (p.393)." So, the data on the profile and views of biology graduates were collected from one of the top-rated state universities in Turkey. It hosts over 25,000 students on a vast campus. The biological sciences department was founded in 1970. It consisted of two fields, Biology (founded in 1975) and Molecular Biology and Genetics (founded in 1996). Although the university has an office for graduates, the department lacks a separate network to connect with its graduates. The biology graduates have not been studied separately before.

Participants

The target of the study consisted of biology graduates. The sample was selected from this population. Firstly, to choose the sample, a pilot study was conducted, and the researchers sent an online survey link to all biology graduates to whom the researchers could reach. This initial survey was prepared by the researchers and included demographic questions. Totally, 176 graduates responded to this survey. Our decision was to include graduates who graduated in 2004, 2010, and 2016 for the main study. The return rate was higher in the graduates of these years. Also, these years might represent distinct periods. After getting their contact information from the department, 133 graduates were invited to the main study via e-mail or phone call. They were asked to fill out the online survey prepared by the researchers considering the initial one. In total, 56 graduates took part in the study. Table 1 below summarizes the participants' characteristics.

Data Collection Tools

The survey for the pilot test was prepared by the researchers in line with the purpose of the study and based on the literature. This survey was sent to all reachable Biological sciences graduates. The initial survey included questions on demographic characteristics (graduation year, level of education, etc.), length of finding a job after graduation, and current career con-

Table 1: The Participants of the Study (n=56)

		f	%
Gender	Female	44	21.4
	Male	12	78.6
Department	Biology	34	60.7
	Molecular Biology and Genetics	22	39.3
Graduation year	2004	20	35.7
	2010	13	23.2
	2016	23	41.1
Level of education	Bachelor	7	12.5
	Master's	22	39.3
	Doctorate	27	48.2
Place to live	Turkey	30	53.6
	Abroad	26	46.4

ditions (current position, the place they work, monthly income, etc.). In the pilot study, the graduates were asked about their contact information for the planned further study. The main questionnaire included questions on attitude towards the department, reasons for choosing their field, satisfaction with the current position, and attitude towards the profession. Moreover, the questionnaire included a 5-point life satisfaction scale (Diener et al., 1985) adapted to Turkish (Dağlı & Baysal, 2016). The Cronbach Alpha value was found as .76. Another scale on 21st-century skills was also included (Author, 2013). The scale had .96 Cronbach Alpha value. The open-ended questions on their suggestions for the bachelor education's improvement were asked in the questionnaire.

Data Collection Procedures and Data Analysis

The approval of the Human Subjects and Ethics committee was obtained from the university before starting the study. The participants were invited to the survey via mobile call or e-mail and informed about the study. The volunteers were sent the online questionnaire. After the data collection was completed, the quantitative data were first cleaned; incomplete ones were excluded; and corrections were made. The cleaned data were summarized using descriptive statistics (frequencies, percentages, means, standard deviation values) through SPSS. The qualitative data were analyzed by the researchers using descriptive analysis. The common codes and themes were created in line with the interview questions.

RESULTS

Attitudes towards the Biology Department

The findings indicated that nearly all graduates (*n*= 53, 96.4 %) pursued biology for personal interest. Of all graduates, 76.8 % put their department in the first five options in the university entrance exam. Half of them stated that they would choose the same department if given another chance; the others either said the opposite, or they were unsure (*n*= 20, 35.7 %). Most of the graduates (*n*=40, 71.4 %) considered that their undergraduate education prepared them for their current job effectively. Table 2 displays the descriptive findings concerning participants' attitudes.

Career, Work-Life, and Life Satisfaction

The study also aimed to examine the career life of the graduates. They (*n*= 39, 69.6 %) stated that their jobs were related to their undergraduate education. Of all, 87 % found their job between one or two years after graduation. Half of them were satisfied with their current job (*n*= 28, 50 %). While 52% (*n*= 29) had academic positions, 36 % worked for the private sector. The graduates working for the private sector and state were mostly employed in executive management positions. Table 3 summarizes the findings of the graduates' career life.

To understand the graduates life satisfaction as part of their general living conditions and work-life, the study included a life satisfaction scale. We found that they were mostly satisfied with their life (*M*= 3.88, *SD*= 0.74), and they reached their goals (*M*= 3.82, *SD*= 0.72). Table 4 displays the descriptive statistics on the graduates' life satisfaction.

Table 2: Participants' Attitude Towards Their Department (n=56)

		f	%
Reason to choose	Personal interest in biology	53	96.4
	Other reasons	3	5.4
Preference in the university exam	1-5	43	76.8
	6-10	8	14.3
	11-15	4	7.1
	16+	1	1.8
Satisfaction	Not sure	20	35.7
	Yes	28	50.0
	No	8	14.3
Effectiveness of the education	Not sure	10	17.9
	Yes	40	71.4
	No	6	10.7

Table 3: Graduates' Career Life (n=56)

		f	%
Relatedness of job with the undergraduate education	Partially	11	19.6
	Yes	39	69.6
	No	5	8.9
Length of time to find a job	0-1 years	10	9
	1-2 years	40	87
	3-4 years	6	4
Satisfaction with the current job	Partially	10	17.9
	Yes	28	50.0
	No	8	14.3
Type of employment	Academia	29	52
	Private sector	21	36
	State	5	10
	Unemployed	1	2
Current position	Executive management	19	33
	Academic position	34	61
	Other	3	6

Table 4: Graduates' Life Satisfaction (M= 3.52, SD= 0.60)

	M*	SD
I am satisfied with my life	3.88	0.74
So far, I have gotten the important things I want in life	3.82	0.72
In most ways, my life is close to my ideal	3.75	0.79
The conditions of my life are excellent	3.18	0.79
If I could live my life over, I would change almost nothing	2.98	1.00

***The scale was 5-point Likert type (5: Strongly agree, 1: Strongly disagree.*

Table 5: Gaining 21st Century Skills During Undergraduate Education (N= 56, M= 3.75, SD= 0.79)

	M	SD
Sensitivity to nature/environment	4.18	0.86
Scientific thinking	4.07	0.91
Problem-solving	4.00	0.95
Universal thinking	4.00	1.01
Taking responsibilities	4.00	0.98
Doing research	4.00	1.01
Working with different groups	3.96	0.87
Lifelong learning	3.93	1.04
Critical thinking	3.93	1.13
Collaborating with others	3.89	0.80
Openness to intercultural communication	3.84	1.12
Flexibility and adaptability	3.77	0.95
Creative thinking	3.61	1.07
Effective use of new technologies	3.59	1.11
Applying innovations	3.52	1.14
Effective communication	3.48	1.08
Media literacy	3.47	1.09
Leadership	3.16	1.25
Entrepreneurship	2.95	1.18

As part of career life, the graduates were asked about work-life challenges through an open-ended question at the end of the questionnaire. A total of 44 graduates answered this question. The findings showed that they had difficulties related to the workplace due to inadequate undergraduate education. These challenges were a lack of bioinformatics skills such as coding and statistics, lack of resources and opportunities at the workplace, challenges in developing a project such as critical writing, inexperience in the bureaucratic affair, and competitiveness in work life. Besides, they mentioned inadequate soft skills such as communication skills, presentation skills, critical thinking, entrepreneurship, and leadership.

Views and suggestions on undergraduate education

Of all, 75% of the graduates (*n*= 42) did not seek support or counseling for career life and career development from the university. They adequately gained most of the skills, including sensitivity to nature and environment (*M*= 4.18, *SD*= 0.86), scientific thinking (*M*= 4.07, *SD*= 0.91), problem-solving (*M*= 4.00, *SD*= 0.95), and universal thinking (*M*= 4.00, *SD*= 1.01) but not entrepreneurship skills (*M*= 2.95, *SD*= 1.18). Graduates pointed out that they did not gain these skills adequately. The statistical results of all skills can be seen in Table 5.

Lastly, the graduates expressed their views on their education and suggestions to improve undergraduate education. They

were asked to evaluate the effectiveness of their undergraduate education. Forty-six graduates shared their opinions. Some of them made positive comments on the quality of their education and instructors, but they criticized their education for lacking enough laboratory and field practice. The graduates considered the laboratory resources to be scarce. The education was not preparing them for business life. When they were asked about the skills to integrate into the undergraduate curriculum, they suggested the following skills: critical thinking, decision-making, and communication. The other skills included bioinformatics and programming skills, academic writing, career planning, entrepreneurship, and presentation skills.

CONCLUSION and SUGGESTIONS

Countries advanced in basic sciences are hatcheries of advanced technologies. Basic sciences may fail to attract the best minds. Therefore, several incentives might be provided to students. Such incentives include generous fellowships for students who score highly in the national exams and choose basic sciences (TUBITAK, 2022). However, despite the fellowships, most successful students' interest in basic sciences eroded over the years, probably due to worries about finding a secure job. To investigate the validity of these worries, we aimed to examine biology graduates. The findings revealed that the participants chose biology in the first place due to their interest. Most of them found jobs in one to two years and pursued a career in the academy. Only 15% of the participants declared dissatisfaction with their current position. We concluded that despite the general belief about difficulties finding secure jobs in basic sciences, in our case, the participants felt satisfied with their current job and life.

Students might choose their department regarding the employability, prestige of the profession, salary, university entrance exam scores, or the effect of their families (Aksu et al., 2010; Kabil et al., 2018; Obayelu & Fadele, 2019) and, in our case, their interest in the subject (Table 2). Since METU accepts students with high exam scores, this result makes sense. These students had various options but chose biology, probably despite the pressure from their family to switch to a more applied field. In METU, over the years, we faced many students who decided on fields with higher employability rates but discontinued their education after a few years, entered the exam again, and started studying biology. Furthermore, most students seem satisfied with their selection. The majority claimed that their undergraduate education prepared them effectively for their career. They acquired most of the 21st-century skills such as sensitivity to nature, scientific thinking, problem-solving, global thinking, taking responsibilities, and doing research. Since almost all followed graduate education, we may suppose they entered the department aiming at academia and to secure higher-quality jobs that required better qualifications obtained through MSc and Ph.D. The desire to be a scientist or academician in basic sciences is quintessential to this field. The ones following graduate education were employed as research assistants, researchers, or academicians. Interestingly, we found that one-third of the graduates were employed in executive positions. This might imply that the graduates were ambitious and successful enough to promote their careers. A caveat of the study is that the more successful participants might be overrepresented in our study. Maybe the less bright graduates were reluctant to join in our research.

All around the world, graduates of basic sciences, including biology, may struggle to find jobs. Accordingly, graduates seek several alternative paths to find positions (Araneo et al., 2017). In agreement with that, in Turkey, half of the biology graduates were employed in areas other than biology (Uni-Veri, n.d.). A qualitative study found that biology graduates preferred the teaching profession due to unemployment and the difficulty of working conditions (Akar & İzzet, 2014). In another study, the biology students in one of the universities in Turkey had concerns about not finding a position after graduation (Özçelik et al., 2013). Similarly, the students stated that they chose to teach as they are worried about not finding a job related to biology majors (Kaya et al., 2016). The primary reason for such a negative image of biological sciences in finding jobs might be the poor planning in opening biology departments. Between 2008 and 2010, new biology departments were opened without concern about these departments' low demand (Günay et al., 2013). Consistently, for example, in 2012, only one-third of the available quota for biology departments was filled (Günay et al., 2013), followed by a stark decrease in requirements to study biology. Everyone with the lowest possible exam scores but a will to study at the university started choosing biology. We suggest that this led to a generation of biologists with low passion and poor employability, eventually strengthening the notion that biology graduates fail to secure jobs. Conversely, the current study suggested that the graduates of METU found high-quality positions and were happy with their decision to pursue biology for their bachelor's. This might be the result of the quality of undergraduate education. Further studies comparative to biology departments of less competitive universities would justify this supposition. If the high quality of education is the valid reason for employability, then the quality of higher education institutions offering studies on basic sciences needs to be re-examined.

On the other hand, the qualitative data revealed that the graduates experienced some challenges in their work life. These challenges were related to insufficient knowledge and skills in specific areas such as bioinformatics. With new technological improvements such as big data and deep learning, the developing business sector requires new competencies (Johnson et al., 2021; Krumholz, 2014). Another challenge was the lack of resources in the workplace. The equipment and chemicals are mainly exported but not produced in Turkey. Thus, it becomes difficult to reach the essentials due to limited funding. Lastly, the graduates specified that they needed communication skills, presentation skills, and self-development, as the lack of these skills also challenged them in their work-life. In addition to this, the survey revealed entrepreneurship and leadership skills as the most minor acquired skills during undergraduate education. In a study, the employers' opinions on the graduates' soft skills were examined (Gruzdev et al., 2018). The researchers found that employers prioritize employees possessing soft

skills but can rarely find those. It shows that a university education might not adequately provide graduates with essential soft skills. The necessary soft skills were cited as systems and critical thinking, developing and implementing projects, teamwork, leadership, and intercultural interaction. In another study, social skills were also essential in work-life, although the graduate thought that they did not gain those skills enough during their university education (Tynjälä et al., 2006). Cooperation with working life can provide invaluable opportunities to university students to observe and earn these skills, or work experience can be more fully incorporated into the curriculum. These skills and up-to-date content knowledge should also be integrated into the curriculum as part of the lessons, seminars, and workshops.

Considering the findings of this study, we suggest that we keep in touch with our graduates to improve undergraduate education. Further research with the graduates could help us see the big picture. The graduates' profiles and career life should be studied thoroughly. Longitudinal studies are valuable at this point. More solid evidence could be obtained about the quality of education to link it with the employability of biological sciences majors. At this point, the biology curriculum can be re-examined. In their study, Özçelik and his colleagues (2013) also found that the biology students criticized their education; lack of practice, number of students, irrelevant courses, and courses on memorization were pointed out as the problems. A study with the students might provide valuable data on the effectiveness of the curricula and education as a whole.

All in all, as opposed to the supposition that graduates of biological sciences cannot find jobs quickly, they actually can. The findings have generally outlined a positive and promising scene about the biology graduates' career life. As stated at the beginning of this study, according to higher education law, education should cultivate citizens who have knowledge, skills, behaviors, and culture of professions in line with their interests and abilities to earn their lives and be happy. The findings showed that higher education attains its aim in our case study. We relate the high employability and satisfaction of biology graduates to the high-quality education they received at their university. These findings might provide insights to policymakers in higher education institutions to improve the career life of their graduates and the current curricula regarding career skills and 21st-century skills.

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