Alberta Council of Technologies

Engaging Youth Project II:

A White Paper on the Future of Work in Alberta

Prepared by: The Centre for Global Education
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Foreword

Our youth are concerned.

We know this because ABCtech, in partnership with the Centre for Global Education, engaged over 3,700 high school students from across Alberta in a dialogue sharing their hopes and concerns about the future of work, community, health and well-being, and – most powerfully – the Voice of Youth.

This unprecedented discussion culminated in the following whitepaper created entirely by these voices of our youth. Troublingly, the loudest and most oft-recurring theme is their concern for the future.

The title itself bespeaks a primary concern to "fit in". The data conveys some discrepancy: When surveyed, the students are quite positive and feel at least a sense of control over their future, but deeper team reflection reveals a significant level of concern. "Instability", "uncertainty", and "precariousness" are recurrent refrains, and their questions beg not just answers, but attention.

In this paper we hear these youth wonder "whose innovation may I become a part of", rather than "how can I create an innovative solution or service or product which will impact myself, my community, and my economy." We hear their desire for Alberta businesses gaining "access to new and emerging markets", but interestingly, not "creating new and emerging markets". There is much discussion around "workforce preparedness", but there is only one call to "lead the charge to redefine our economy".

If we listen closely, this paper is really a cry for action. There is lament – almost a resigned acquiescence to an inevitable future dictated by technology, rather than viewing technology as the tool we control to create a better world.

Should we really be 'training' our youth to "fit in" to an existing (and possibly soon-to-be obsolete) economic model? Or should we encourage an entirely new mindset: guiding and empowering them to create new pathways – and entirely new economies. If our youth simply can't imagine beyond 'entry-level', we are faced with a glaring and frightening failure of imagination. The failure is ours, and the responsibility is ours to correct.
This paper – this unprecedented dialogue – is a magnificent step toward this discovery. Clearly we are in early stages, but if ever there were a more worthy conversation and journey to embark upon, it is this. We invite you follow and support our work as we continue the dialogue across Canada in 2019, and globally in 2020.

Our sincere thanks to our Advisory Team for their guidance, and to Servus Credit Union, ABCtech, and Perry Kinkaide for their generous financial support, without which these voices would remain unheard.

Haley Simons
Director, Alberta Council of Technologies
Chair – Engaging Youth Project

Alberta Council of Technologies

Where will our Generation Fit?

Prologue

Between March and June 2018, hundreds of high school students from across Alberta came together to express their thoughts, questions, and concerns on the issue of the Future of Work in Alberta through video conferences, virtual classrooms, and online surveys. Under the guidance of expert mentors, the participating students collaborated on a 3-month learning project. They shared ideas, knowledge, and experiences, informed by their schools, regional cities, communities, and peers. This culminated in a final, real-time provincial dialogue focusing on the Future of Work in Alberta. In an effort to capture and capitalize on their shared passion, they co-wrote the following paper, ***Where will our Generation Fit?*** Within these pages, Alberta youth advocate and challenge Canadian educators, industry, and governing bodies to listen, engage, and respond to their questions, concerns, and calls for action.

Welcome

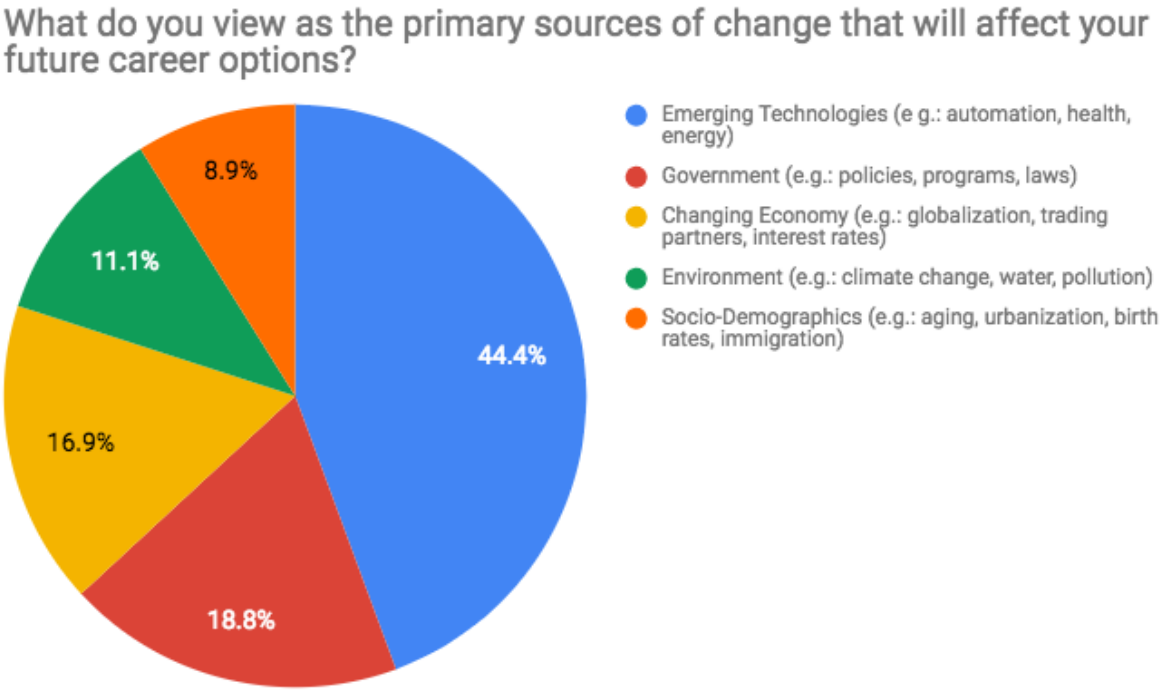
Starting in March 2018, our classes and student groups from across Alberta began an online journey to explore the impacts, issues, and potential opportunities facing Albertan youth as we look to the future of work in this province. Through common interest and shared enthusiasm in thinking about the future of our province, country, and humanity at large, we completed weekly assignments, created dialogue across blog posts, as well as communicated with one another through video conferences. Week-by-week our confidence in our ability to understand and challenge conversations around the future of Alberta, in our homes, schools, cities, and even our province grew. In our final meeting, we held a 4-hour virtual town hall that brought together over 200 students from across Alberta in real-time to explore our common thoughts on issues related to the future employment landscape, careers, and pursuit of rewarding livelihoods. We followed this with a provincial survey, collecting the opinions of 1950 Albertan youth on assessing student confidence in the future of work.

This paper is a synthesis of the conversations, arguments, questions, and dialogues held by those 200 students over the course of two months. The importance of this work is reflected in the results of the survey of the general student population. Our survey shows that although students are currently feeling confident about their future, when it comes to thinking about their future careers, over 65% expressed notable concern. Three main issues came into focus as we discussed our questions around the Future of Work: Sources of Change, Global Trends & Sociological Implication, and Education & the Constant Demand for Change. These issues are serious concerns to all Albertan youth. Knowing that the consequences of inaction on these issues could be crucial to our - and everyone's - future, we have outlined our calls to action. We ask you to read, consider, and then rise to meet our challenges and goals for the future of work in our province.

I. Sources of Change

Digital innovation and Artificial Intelligence

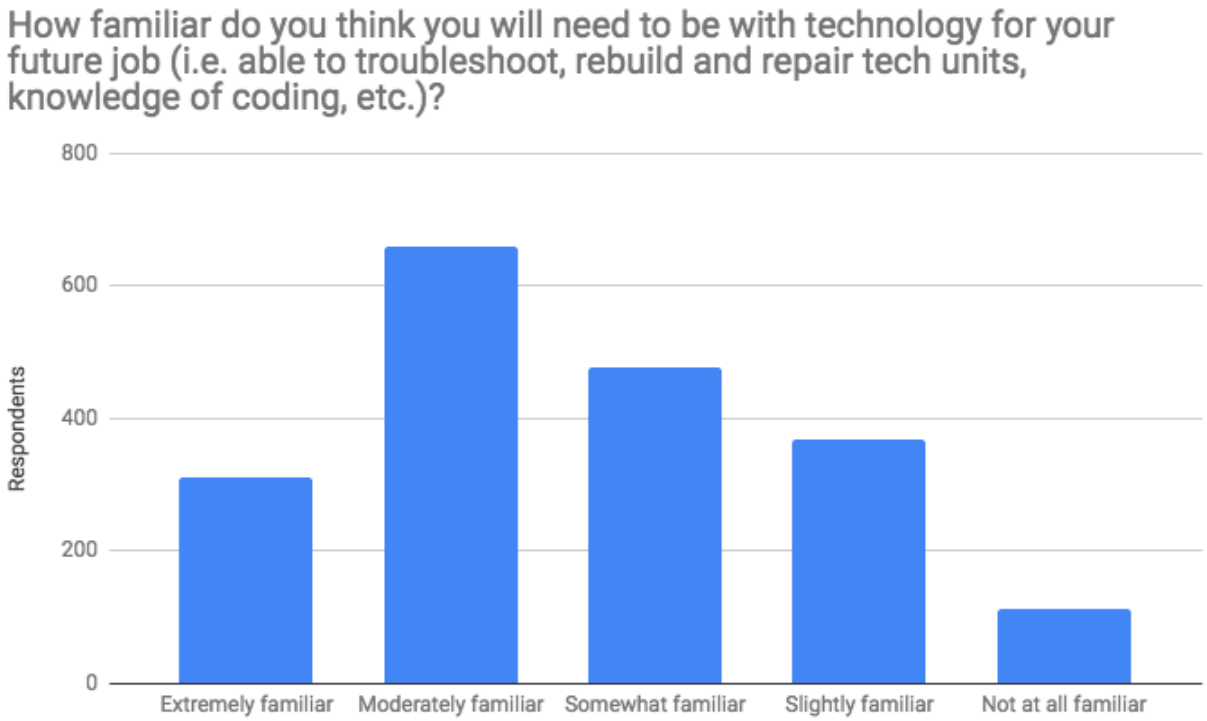
Through this project, We, the youth of Alberta, became increasingly aware of the ways in which digital innovation and Artificial Intelligence (AI) have become extremely pervasive throughout all aspects of our daily life and work, and how their prevalence will only grow in the future. These new technologies will not only replace many of the technologies we use today, but they will innovate how we work. AI and advancements in robotic technologies will have a major effect on jobs, careers, and the landscape of future workforces; impacting the techniques, workplaces, and the security of our employment. Consumerism and business also have significant ties to technology, affecting how goods are produced, how much they cost to the consumer, and how market forces and stakeholders interact. There is no question that the pervasive nature of technology has numerous ethical concerns, especially regarding personal privacy and data security. Dealing with these issues will be paramount to moving towards our understanding of the future, and our place within the future of work.



AI, Careers, and the Workforce

> ***"I predict that by 2030, automation, artificial intelligence and robotics will decrease the number of jobs and people in the workforce. Workers whose jobs are directly affected by automation, AI and digitization will need to search for alternative non-traditional employment. Whether it is temporal, freelancer or self-employed, these forms of jobs are unstable and increasing across Canada."***
> Milagros, Jasper Place High School, Edmonton

As stated by the project participant Milagros, in the quotation above, we understand that Artificial Intelligence, robotics, and mechanization will have substantial influence on employment and the workforce. We see the ways in which entry level jobs are in danger of being taken over by AI. Examples of this precariousness is the rate of self-driving cars overtaking taxis and even ride-hailing services. Administrative assistants may become unnecessary since people are able to complete many tasks online, such as making appointments and checking in.



> "***As for the workplace, I believe more simple jobs such as cashiers and sales associates will move towards AI. I don't expect AI to fully take over the workplace but its presence will be significant. More complex professions that require a great deal of human interaction such as doctors, nurses, investigators, police officers, paramedics, teachers, counsellors (and much more) will still be present by 2030."***
> Jolene, Queen Elizabeth High School, Edmonton

This also has implications for entry-level work in general - which can largely be covered by automated technologies. This low accessibility to entry-level work may be offset by high job availability in other fields, such as the programming and maintenance of new technology. However, an increased demand for highly specialized and skilled labour in repairs or supply-chain management, for example, would require corresponding experience and lengthy training programs to fill specialized roles. This shift to higher-skilled labour raises concerns for youth in Alberta around the availability of employment that allows for basic skill development and low-stakes risk-experiences within the job market for younger members of society just entering the workforce.

Our Questions:

How will we be compensated (i.e. retraining) if we lose our jobs or opportunities to automation and mechanization?

What solutions are there to creating entry-level opportunities should AI occupy them?

How will we be assisted in matching AI productivity or finding/creating opportunities where AI is not advantageous? (Opportunities for entrepreneurship - specialized funding? Internships? Entirely subsidized education?)

What opportunities exist outside of traditional education streams that could offset an AI driven workforce? What entry-level opportunities may still exist that will not require post-secondary education?

Biotechnology

We, the youth of Alberta, believe the future of work in the biomedical field is brimming with possibility, which may introduce a new sector into the Albertan economy. Biomedical engineering is where medicine, biology and engineering collide and work together to facilitate, improve, and advance healthcare. While some jobs will become obsolete with new advancements in this field, innumerable jobs will be created with this great economical change. In the last decade alone, Alberta has witnessed dramatic evolution in biomedical engineering technologies. The pace of innovation has accelerated quickly, and these advancements will allow us to live healthier and longer lives. This will significantly influence how we view our future in the workforce.

The biomedical field will be redefined by digital innovation making it more efficient and providing better care for people, yet also bringing up a number of questions related to ethics.

> ***"DNA synthesis and modification is an idea that seems ideal in its pure essence. It has the purpose of creating genes (sic) to prevent diseases and conditions that may appear in the future, increasing the quality of life of not only a person but a nation."*** - Milagros, Jasper Place, Edmonton

Many societal impacts will result from the application of biomedical technology. One way the biomedical field will impact our lives and future choices is through the field of genetic engineering and biomedical technology. Statistics Canada determined that "Canadians can expect to spend 70 of 80 years in good health"[1], and yet, it is thought that biomedical technology and medical advances will continue to increase life expectancy. Increased longevity will allow us to spend more of our lives exploring multiple career paths, and pursuing our own personal interests and dreams; however, this may result in people choosing (or needing) to delay retirement and stay in the workforce for a longer period of time while likely seeking supplemental, low-training employment. We believe the speed of advancement in technology could impede older populations staying in or entering the workforce, but that this could be negated by retraining programs and opportunities for older populations.

Our Question:

Where will ours and future generations fit into the possibility of an ever-aging, but continuingly capable, workforce? Will there be enough opportunity for all?

Biotechnology, Careers and the Workforce

With the enhancements in biomedical technology, we want to consider this field in the context of the applications of this technology in the creation of new jobs and the loss of present jobs, and the training required for operation/maintenance of future careers. One consideration that concerns the youth of today is how will these enhancements impact sectors such as the medical field in terms of the demand for professionals? On one hand, there would be a demand for biomedical engineers to work in the increasing biomedical field. On the other hand, If people no longer (or in reduced numbers) experience severe or life-threatening illness and disease, there will be less of a demand for physicians, nurses, paramedics, and other

[1] https://www150.statcan.gc.ca/n1/pub/82-229-x/2009001/demo/lif-eng.htm

front-line medical personnel. However, the loss of these professionals could also create a loss of the emotional connection and bond that is essential to the patient-caretaker relationship that currently defines quality healthcare provision. Speculations about the future with the consideration of how technology will impact human interactions has been a trending topic throughout our discussions. With all these changes in the workforce, the education system will have to change to adapt alongside the advancements in biomedical technology.

The rise of biomedical technology could also lead to increased health expenditure. Since people will live longer, they will put greater demand on the healthcare system by accessing life-prolonging technology, in addition to the stressors of a growing population of people accessing day-to-day healthcare professionals and services (podiatrists, physiotherapists, massage therapists, allergists, etc.) The increased government investment in the healthcare industry will have a financial impact on taxpayers, especially on the younger generations which are now outnumbered by the older ones. We, the youth of Alberta, worry how this future will financially impact us, compounded by prolonged lifespan, and changing job markets.

> ***"In Alberta, the synthesis of DNA can help prevent diseases and open new jobs for specialists in the field, it might alter the DNA of people to make them better at their jobs or create new ways of understanding human evolution. The extension of the human mind with computers may create new ways of understanding human behavior..."*** - Andrew, Queen Elizabeth High School, Edmonton

We predict that the advancements in the biomedical field will lead to changes in the medical workforce, in addition to increasing the longevity of our lives with better healthcare. We may see a lengthening of our time working, and overall a better quality of life. The enhancements in the biomedical field also bring up the questions of how it will affect careers in the medical field such as physicians, nurses, paramedics, and other jobs. The biomedical field also has the potential to become a major contributor to the Albertan economy. However, we must keep in mind religion and ethics, and ask questions as to what point genetic modification is helpful, and at what point it is crossing a line. We all hope that the biomedical technologies will positively impact our daily lives.

Our Questions:

How are schools and our current educational experiences preparing us for biotechnology and medical careers in the future?

How will society be impacted by greater automation (de-personalization) of healthcare services?

Will people be expected, required, or encouraged to enhance their biology to specialize and succeed in future jobs?

How will the voice and ideas of youth be incorporated into these conversations?

II. Global Trends and Sociological Implications

Globalization and Energy Diversification

We, the Youth of Alberta, already directly experience the ways that the world is becoming more globalized. We feel that, ideally, Alberta would become a hub for identifying, designing, and producing complex and emerging technologies. In this way, Alberta consumers would have more access to goods produced around the world. Equally, Alberta businesses would have access to new and emerging markets. The risk is that increased globalization and mechanization will lead to a constant search for cheaper business costs, resulting in competition leading to cheaper goods. Alberta businesses, and the workforce they are recruiting, need to develop skills and adaptability that will allow them to be more creative and open-minded in how they approach consumers and also look outside the country to develop and sell their products.

As the entire planet moves towards more sustainable ways of living, there is a great need to diversify the work we consider available in Alberta for international export. We need to redefine the focus of our economy to increase export and outreach for creative jobs. Under the Climate Leadership Plan, the Alberta government initiated the "30 by 30" renewable energy target. By 2030, 30% of the electricity that Albertans use will come from renewable sources such as wind, solar, and hydroelectricity, with the rest coming from natural gas. Beyond impacting Alberta's environmental footprint, this change also affects industries and jobs as well.

In a similar way, Alberta youth voiced the need to push for change, adaptation, and development. The youth in this project voiced an overwhelming support of renewable energy sector/market. If Alberta is able to prioritize demand and funding for renewable and sustainable energies, the economic and social dependence on coal and fossil fuels will diminish - a necessary and timely shift. In terms of how this shift to renewable energy affects jobs, accelerating interest in the alternative energy sectors will create more demand for jobs in the field such as solar panel installers, wind turbine installers, programmers, project managers, engineers, and wind farm developers. Education needs to transition and evolve parallel to these emerging markets. Job training and skill development needs to account for finding work in the renewable energy sector and its tangential career pathways. In terms of careers, with adequate education and readiness training, We, the youth of Alberta, believe strongly that the transition from the coal energy industry to the renewable energy industry will become easier and more palatable for the economy, the marketplace, the workforce, and, eventually, general attitudes and preferences.

Given the primary role that the oilsands play and will continue to play in Alberta's economy, it is integral that we find cleaner and less carbon-intensive ways to extract and refine the resources. In connection to this, the youth of Alberta are calling for ways to extract in more environmentally-friendly ways to ensure that our oil is the cleanest product produced. The potential risk of not addressing this issue is that people will hesitate purchasing natural gas supplies from Alberta in as large of quantities. When the majority of Albertan youth responded to our survey indicating that by the year 2030 emerging technologies will create entirely new careers, this includes the oilsands industry.

Our Questions:
How are we being trained and skilled for careers in the energy sector of our future?

Who will lead the charge to redefine our economy to increase export and outreach for creative jobs, marketing, advertising, entertainment industry, tourism, art, etc.?

Ethics and Socioeconomics

As our jobs become increasingly specialized and technology dependent, the demands in expensive specific training will inevitably cause a dramatic change. We, the youth of Alberta, are concerned that those who are considered within the lower income demographics of our society may feel increasingly marginalized, as they do not have the same access or financial means to receive the training necessary to find employment. The perpetuation and potential widening of this gap could further contribute to socioeconomic disparity, creating a future where only those wealthy enough to pay for training and education can secure employment.

We do not see a near future in which we have shifted away from employment as a requirement for adequate income. Though society may eventually transition to a future with no/low employment and pursuit of creative and personal interests as the driving force, and universal basic income, we do not believe this will happen in our lifetime. We believe that this movement will be gradual, and that increasing reliance on technology provides the thought of this eventuality, but planning should be for our success within the realm of increased AI, and more advanced technology. The benefits of new technology should be embraced, including but not limited to: efficiency, precision, and better support to make work easier. However, as more technology is brought in, the world needs to anticipate and plan to transition from traditional notions of jobs to new ones. Job security needs to be ensured, so that lives aren't destroyed in the name of profit. This is a concern, because as less jobs become available, there are more people without income. This could lead to a greater income disparity, and prevent those willing to contribute to society from doing so, instead forcing them to use up resources and live dependent on social services.

Additionally, globalization brings its own sets of challenges. A market made more competitive by the integration of technology would not only present risks at home, but also internationally - this systematic globalization would mean that work does not necessarily have to be done in Alberta. If other countries can offer more affordable services with fewer questions asked, local economies will lose even more profits. This would present a plethora of ethical issues. Poor environmental regulations would allow for further environmental abuse and possibly set back conservation efforts, perhaps undoing progress made to protect the natural world. The competition to provide the cheapest product could result in a deviation from efforts to source materials sustainably, as well as manufacture responsibly. Moreover, it must be considered that these pursuits could lead to outrageous exploitation of vulnerable sectors of the work force, perhaps reminiscent of the working condition crisis during the industrial revolution.

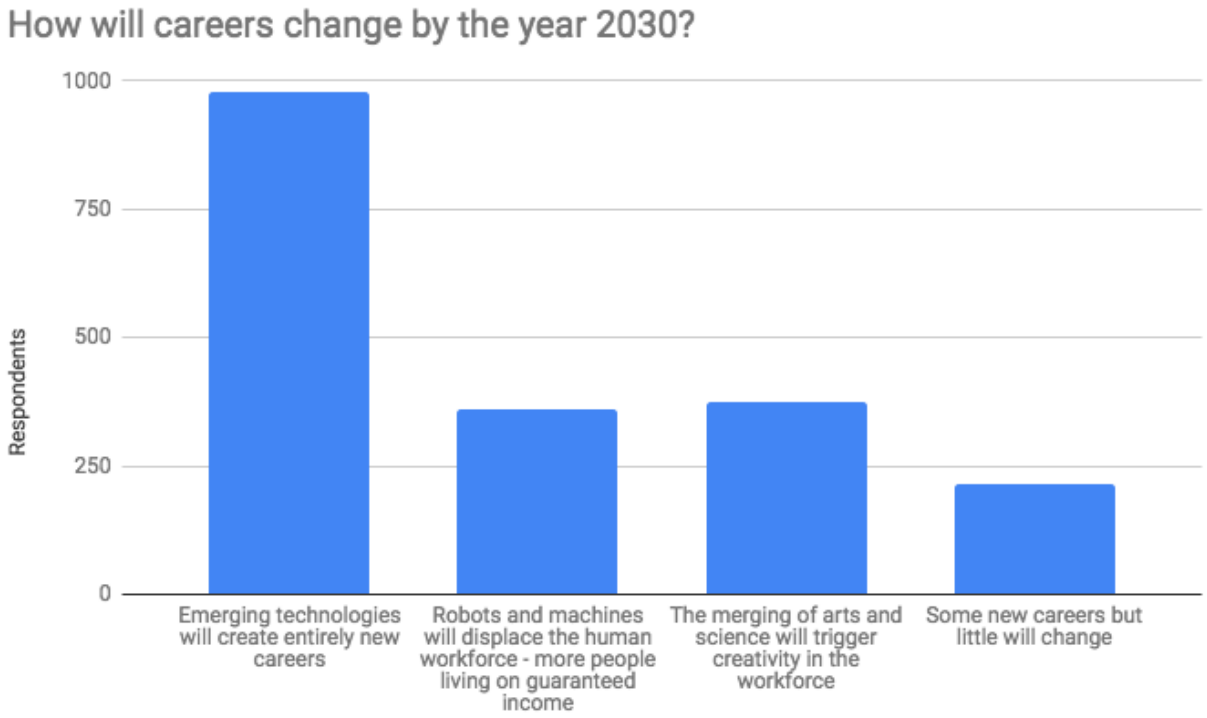
Though we approach these topics through the lens of technology, they are also rooted in the social and economic aspects of society and cannot be separated from these elements. If regulated and monitored carefully, new knowledge such as this could be a force for good and help our market to thrive; unchecked it could weaken the fabric of our society by encouraging the growth of socioeconomic disparities.

Our Question:

Will a market so influenced by advancements in Artificial Intelligence and associated technologies still leave room for humanity?

III. Education and the Constant Demand for Change

Since the industrial revolution, education has maintained a relatively consistent structure despite shifts in the workforce. The core aspects of education in the present day revolve around evaluating student learning through tests and projects that mainly reflect a student's ability to memorize and spit out facts. Multiple choice is the main system for testing, but we feel it can work along with creative learning and other methods to demonstrate different approaches to learning. It is important to recognize that institutions, such as schools and post-secondary programs, are meant to prepare people to be productive citizens to serve the goals of a nation. Furthermore, we are aware of, and concerned about, the constant growth of technology and the replacement of repetitive and entry-level jobs that are supposed to serve as our introduction into the workforce.



As stated earlier, we believe that our prediction will see the growth of technological industries and industries that require humans to be creative and use abstract thought in their jobs. Our survey results show that over 50% of youth feel that they are not prepared for the workforce and that their education is not helping them prepare. The choice of electives versus core classes raises questions of whether core classes are adequately preparing us for the workforce. We also question whether students' choices of electives relate to their development towards being incorporated into the workforce or if their choices are based on more personal requirements that do not fulfill this purpose. Young people feel that the current education system can improve in order to prepare us for the future of work, or that we can be better informed about what choices to make in order to prepare ourselves for our futures. Furthermore, analyzing the education we are currently receiving, we the youth of Alberta, feel a pressing need for the education system to undergo a revision to accommodate the ever-changing world. Our education system has to be relevant, accessible, and evolve with the constant changes happening in the workforce.

"Jobs are changing so our education will have to evolve with it. Teachers will need to better learn how to use technology and teach kids using it more. Since technology will be incorporated more and more into our lives, we will need to learn how to efficiently use it."

- Student, École Secondaire Sainte Marguerite d'Youville, St. Albert

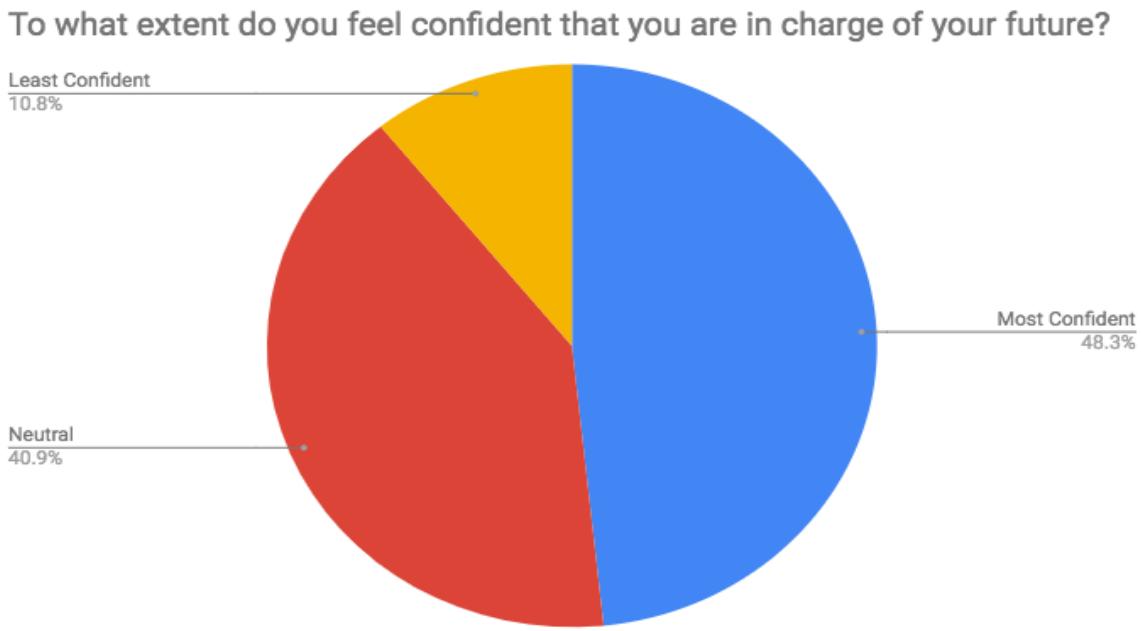
Advancements and adjustments in education could include the implementation of specialized courses that allow students to learn about a field aligning with their interests and skill sets. This would provide increased opportunities for student participation in experiential learning opportunities with individuals that are currently in the workforce. These courses could include community volunteerism, research projects, and internships. Education is suggested to be more globalized through the use of technology to allow students to adopt a more diverse mindset. The main purpose is that through this specialization of learning, education would be made more relevant to students' future career paths. We, the youth, believe our education system should mandate that all courses have to incorporate creative, global, and intercultural learning.

System Adaptability

Education needs to be adaptable and personalized for every individual. We, the youth, suggest that education models evolve into different learning categories that derive into customized, philosophical, and globalized learning. Customized learning will fit the needs, abilities, and ambitions of a student. Philosophical learning will help develop and enhance creativity, skills, and critical thinking. Globalized learning will implement technology that allows us to communicate with people around the world, which lets us expand our empathy and broaden our spectrum of knowledge.

> ***"He (John Moravec) coined the term "knowmad," (a play on the word "nomad,") essentially a freelance thinker. He argues that "knowmads" are innovative, creative collaborators who are not afraid of failure."*** Devon, Career and Technology Centre (CTC), Calgary

A common aspect of these learning categories are the skills taught, some of which are needed in every-day aspects of our life, but can be cumbersome for an individual to achieve on their own. Skills such as critical thinking, creative thinking, conceptual thinking, communication, and leadership aid in the ability to complete a job effectively. These skills also allow individuals to get out of their comfort zone, which enables them to be more flexible and open minded; as well as be able to be time effective, financially aware, and fully independent. We suggest that these skills are to be implemented in young students throughout their courses. Hence, the education model should change to create these three categories of learning in order to shift the current model to an iterative model, which will establish adaptability in the changing workforce. We, the youth of Alberta, want educators to broaden the ways in which they develop these skills in students and within the classroom.



Access to Education

Educational institutions in the next years will need to focus on implementing technology and its use, as well as resources that make opportunities accessible to the public. As technology becomes more prominent in the workforce, there is a growing need to learn how to use these tools to create a widened network of human interaction. Online platforms such as virtual reality will allow us to socially interact, learn, and experience places without having to travel. Furthermore, the use of technology can be time efficient, create new opportunities, and accelerate learning. In addition, utilizing data about current jobs and their availability and sustainability in the workforce will give students a baseline for their elective decisions. Although we are still taught to work towards certain traditional jobs, these jobs may disappear in the near future due to technological advancements. Implementing technology and facilitating its use will ensure that the disappearance of traditional jobs does not affect future generations.

> ***"Lastly, I hope that by 2030, basic technology such as connection to the internet will be accessible to people all over the world, since being connected to the internet is such a valuable thing. It is a place where billions of people are involved in the selling, buying and sharing of information."*** - Jolene, Queen Elizabeth High School, Edmonton

With advancements of technology, education must adapt in order to continuously be effective for society and relevant to the workforce. As technology becomes more prominent in our everyday lives, it becomes an extension of knowledge and social interaction that is available to all. We, the youth, believe that the implementation of these tools will allow change, enabling us to be innovative, create opportunities, and develop competency skills. However, we must be conscientious of the fact that we cannot become fully reliant on these technologies. While students feel unprepared and doubtful about how the present education system is preparing them for the workforce, changes can be progressively made in order to improve the system.

Our Questions:

How will the education system change to prepare us for adult life? Namely budgeting and taxes, coding, and interacting with computers.

How do teachers stay up to date with technology, and implement it in the classroom more?

With different technological skills becoming more and more important to everyday life, how can the life skills of technology by incorporated into curriculum?

How do we ensure, as technology becomes more integral to success in education and the workforce, that access to and education around these advancements are available to all - irrespective of socioeconomic status, age, ability, etc.?

Conclusion

> ***"He (Tony Wagner) says that "the 'problem' is, simply, that the future of our economy, the strength of our democracy, and perhaps even the health of the planet's ecosystems depend on educating future generations." This idea that changing education so that it prepares students for being a citizen in not only the 21st century but the future; is an effective way of preparing for the unknown. By building skill sets instead of mindsets students/future generations will be able to work with a changing future and imagine new innovations in an adaptive manner."*** - Shauna, Career and Technology Centre (CTC), Calgary

We, the youth of Alberta, believe that by 2030 Alberta will be vastly different due to the expansion of digital innovation/artificial intelligence and the rise of biomedical technology. We believe that to accommodate these changes the education system will need to be revised in order to help prepare the students for the future. With such advances in technology, jobs will become more specialized and require more training, but we must also learn how to coexist with such advances without losing our humanity. The technology that is created must support ethical and sustainable standards while contributing to a green economy. We, the youth, believe that technology and biomedicine have the potential to greatly advance our quality of life. But these technologies must not be simply profit driven; they must also consider their greater impacts, ethical, and moral implications. We want to see these technological advancements distributed in a more equal manner that helps us preserve our humanity and involve human interaction.

We, the youth, believe that an updated education system is a method through which future youth can adapt to a technologically advancing world, while fostering critical thinking and maintaining the ever-important human interactions that allow us to empathize with the world around us.