

How Can Artificial Intelligence Change the Way We Work and Learn?

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Abstract

The rapid transformation of the economic landscape due to automation and artificial intelligence (AI) points to the need to reskill workers affected by technological disruptions in a scalable and effective manner. Work processes and job roles are constantly evolving. Current measures to keep pace with the changes have been difficult especially for workers who may not be sent for training or with SMEs that may not be in tune with global developments.

Conversely, the advancements in AI offer opportunities for new modes of learning engagement at the workplace and for the individual. More specifically, there is tremendous potential to design and develop chatbots for the purpose of upskilling new and current staff via a conversational coaching approach. With artificial intelligence underpinning the conversations and subsequent learning, the learners engage with the chatbots in bite-sized exchanges. In addition, inherent in the conversations are elements which can make learning adaptive, emotive, fun and reflective. It is akin to talking to a personal coach except that the chatbot is available 24/7 and possibly more affordable.

Key questions that need to be addressed are: what is the learning experience like for learners? Can enterprises develop their own chatbots for in-house staff development? How do workplace trainers and supervisors fit into this paradigm where chatbots become assistant facilitators to the learning process?

In past year, Dioworks Learning has had the opportunity to work with numerous organisations to jumpstart their AI strategy especially in learning. Chatbots on onboarding, digital literacy, workplace literacy and even a fun chatbot on driving skills have been developed. Going forward, we will be working on different types of chatbots that will further drive and deepen workplace and individual learning.

Dioworks Learning is the local partner to Udemy in Singapore and is an approved training provider under the CITREP+ training scheme.

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Introduction

The adult education sector in Singapore is somewhat of an enigma - the workforce is highly trained and yet when asked about learning, most Singaporeans don't think too much of upskilling. It seems like it is somebody else's problem, not theirs. However, the reality is that there is significant transformation in the economic landscape. New sectors such as artificial intelligence and automation are mushrooming. There are insufficient skilled workers in those industries. On the other hand, sectors such as retail are facing competition from online stores and are slowly reducing headcount. Going forward, whether there is a need to shift the workforce from high touch, low tech to low touch, high tech is still unclear but what is clear is that the government is not taking chances. Massive upgrading efforts by Skillsfuture Singapore, a statutory board in the Ministry of Education to transform the workforce has been ongoing for the past 4 years. The focus has been to imbue adults with lifelong learning mentality.

While Pre-Employment Training (PET) in Spore has evolved over the decades with somewhat distinct phases due to the onset of national policies, Continuing Education and Training (CET) is more of a slow cook. The impetus to upskill for most Singaporeans comes only when one loses his or her job or wants to move into a new role. In Singapore, due to the tight manpower regulation, the jobs and skill base balance is relatively well maintained and monitored. This also means that, at the individual level, adult learners may not see the need to upgrade. There is the expectation of jobs waiting for workers, as long as one is not fussy. However, this is changing quite rapidly especially in the past few years. Some PMEs cannot seem to find jobs for more than 6 months even though they are highly skilled. Essentially, their specialised skills have become obsolete. Hence, reskilling workers to take on new jobs has become urgent, in the light of AI and automation.

Transforming CET

Besides technology-driven changes leading to specialised jobs that are knowledge intensive, the rollout of the national Skillsfuture programme which comes with strong government machinery has been instrumental in driving Singaporeans to consider learning again in Singapore.

One of the key government interventions include the shift from classroom training to include more online and workplace learning. This diversification of learning approaches provides adult learners with alternative sources of content such as Udemy and Coursera. Deloitte (n.d.) reported that MOOC platforms such as Udemy provided expert practitioners the opportunity to offer their content online "... so the MOOC market, which originally started in higher education, is rapidly expanding into corporate and personal learning as well."

Case in Point

Aaron, a hardcore Udemy learner, has bought more than 20 online courses for his learning and professional development over the past 2 years and he is not the only one. It is not uncommon to see serial learners to buy 5 to 10 online courses at a go. They accumulate the courses for their future learning. More importantly, they find the courses useful to improve their

To develop the individual adult learner, it may be necessary to consider a blended approach (NMC Horizon Report, 2015) where classroom training and work-based learning will be needed to inculcate values and ethical considerations for a particular job role. The role of e-learning could be to infuse media-rich cognitive stimulus to broaden the contexts of learning and application for that same job role and beyond.

Even back in 2014, the then Senior Minister of State for Manpower, Dr. Amy Khor, was quoted in Parliament:

... many SMEs also gave feedback that the tight labour market made it difficult to send workers for training. WDA will thus enhance the ETS (Enterprise Training Scheme) to support e-learning and mobile learning ... This will provide more flexible training options for workers and ... reflect learning in a digital age.

Funding was provided to encourage training institutions to convert their training programmes into online courses, leading to blended curricula, which give flexibility to busy Singaporeans to participate in upgrading. E-learning companies such as Dioworks Learning came to the fore in driving the e-development agenda for the CET sector.

The 3 Great Shifts at Work

- I. Competency to Expertise
- II. IQ to LQ
- III. EQ to RQ

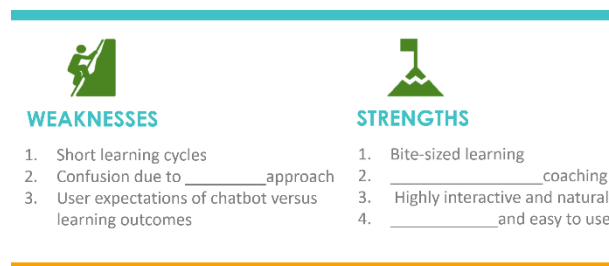
These 3 great shifts will have an impact on the way work is carried out and by inference, how CET needs to be conducted.

- I. Competency at performing a task is not sufficient in the future for the simple reason that competency as defined by measurable behavioural outcomes will likely be taken over by intelligent machines. Humans will need to be experts in order to work and the nature of work will centre on what experts do currently which include innovative solutioning to resolve issues, pre-empting problems and providing advisory. Being competent will not be good enough, unfortunately. The emphasis will be on gaining expertise. Hence, adults will need more years of training and experience to reach expertise. The current national credentialing system which emphasises competency-based training and assessment will have to be reviewed to layer on other pedagogies for development of expertise. For example, I utilise DELETE™ as an error-based learning methodology to develop experts. The response to DELETE™ has been positive simply because experts can be groomed not just via trial and error but through an intentional and well-designed programme leveraging on errors to drive deep learning. Part of our work at Dioworks includes using innovative pedagogies such as emotives (like Korean drama), learner's voices, deep reflection to deepen and broaden learning. There could be other technologies and programmes that develop expertise and these will be emphasised in the future.
- II. LQ stands for Learning Quotient. As the half-life of content becomes shorter, the ability to learn fast and fail fast will be valued, possibly as much as IQ. Experimenting will become the new normal for learning and LQ the new buzzword for capability.
- III. It is likely that you have not heard of RQ. I coined it during a presentation at the Asian Development Bank Forum last year. I mentioned that Robotic Quotient – knowing how to work with robots and intelligent machines - together with Adversity Quotient and Emotional Quotient will be critical for our next generation of workers. Being able to work with intelligent, decision-making robots, some as our colleagues, subordinates or possibly as our bosses, will be needed in the workplace of the future. Just to paint the picture, how would you feel if your robot boss or colleague chided you for poor performance? Not a pretty picture I am sure.

These 3 shifts may not portend much at this point in time but if we can extrapolate to understand the needs of the workforce in the next 5 to 10 years, it is clear that our future generation is not yet equipped to deal with the workplaces of the future. What should we do about it? Can Artificial Intelligence (AI) help?

AI-Driven Education

Our experience in the AI space has been to utilise Chatbots for Learning. There are some key shifts from typical chatbots which are more FAQ in nature. We intentionally crafted chatbots for learning to provide a short and personable experience for learners using a coaching approach. The chatbots we design have specific strengths and weaknesses. See figure to the right for details.



The Rise of Chatbots

Notwithstanding, the rise and rise of chatbots (and Artificial Intelligence in that same vein) is a reality that confronts us every day (state stats) - from recommending similar courses on Udemy to autonomous vehicles and writing reports. Closer to the ground, chatbots are possibly the disruption that the learning industry is waiting for. To be clear, chatbots are not developed for learning but to answer queries. Hence, to develop chatbots for learning a paradigm shift to move the user from a receptive role (receiving answers) to an active, responsive role (to reflect and respond). The shift is not just a matter of mindset change but also a fundamental switch in engagement strategy. Besides giving answers, the chatbot needs to probe and facilitate learning.

Case in Point
It was an amazing chatbot. Samuel kept firing questions and the chatbot responded in an equally speedy fashion with answers that made a lot of sense. Some the difficult questions concerning the product were handled with great intelligence. Samuel was astounded. Finally, he could not believe how smart the chatbot was and asked, "Are you really a chatbot?" the answer that came back floored him. "No, I am a human!" Obviously, his bubble of intelligent chatbots burst that day.

Why Chatbots?

Chatbots can be really dumb but they are also personable, informal and personalised. More importantly, they are often found on popular social media platforms such as Facebook, Skype and Slack. These are apps that people use regularly.

Many of us go into an LMS to undertake a formal course occasionally and we do think it is a pain. However, going to a social media platform to socialise is enjoyable to most of us and Chatbots are found there. By association, we may not mind some chatbots especially if the objectives of these chatbots are clear and they have particular personalities that are designed thoughtfully.

What other characteristics do chatbots have? That's an important question. Chatbots can do a number of things:

1. They **chat**. That's stating the obvious but this is the feature that makes chatbots so appropriate to help people learn. What do I mean? Chatting is interactive and contingent on how the conversation goes. If the outcomes are clear, chatbots can take learners through an experience that is beneficial and positive. Learners can drive the conversation while chatbots

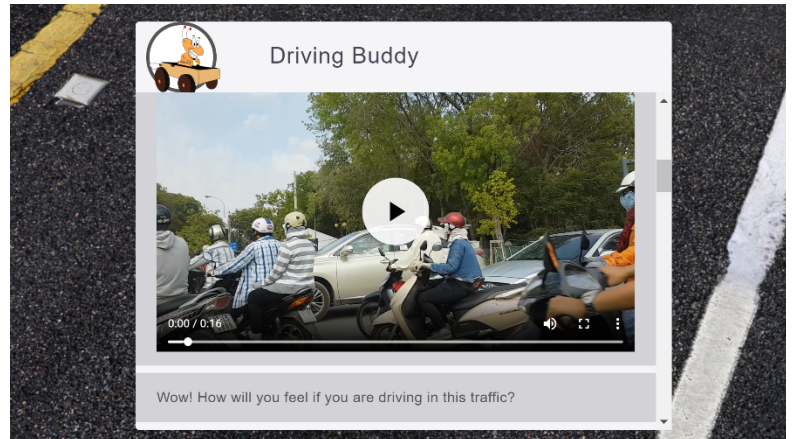
can both respond and probe to deepen the learning. The design of the chatbot needs to be facilitative rather than prescriptive.

2. They **avail** themselves - 24/7 to be precise. We understand that there is always a window of opportunity when a learner is open to learning. Some call it the teachable moment. Chatbots are not just available, they can be at the right place - the junction of social interaction, all the time.

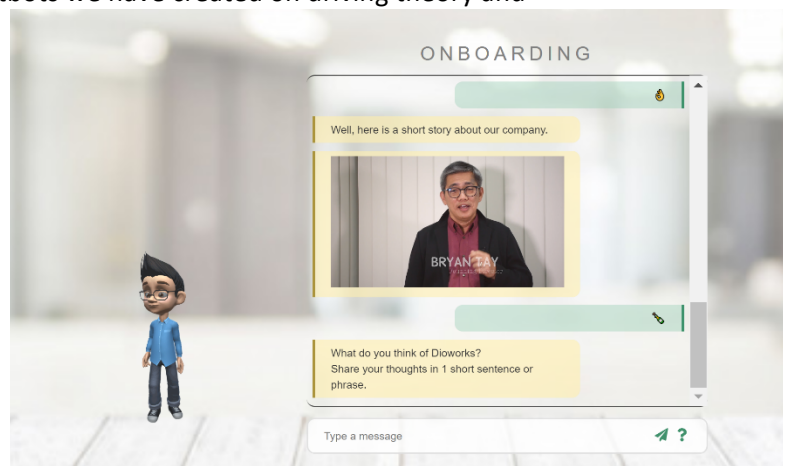
3. They **reach out**. They can ping you occasionally to initiate conversations. This makes the exchange more spontaneous and fun. I can imagine chatbots asking me about my opinion about the latest Apple product or newest ruling in my sector. How cool is that?

4. Chatbots are **current**. They can provide the latest information or content with tweaks to the programming.

5. Chatbots have **personalities**. It really depends on who designs the chatbots because you can make it tell jokes, shape it to be serious or anything in between. The personification of the designer in the chatbot is a possibility and that humanises the chatbot.



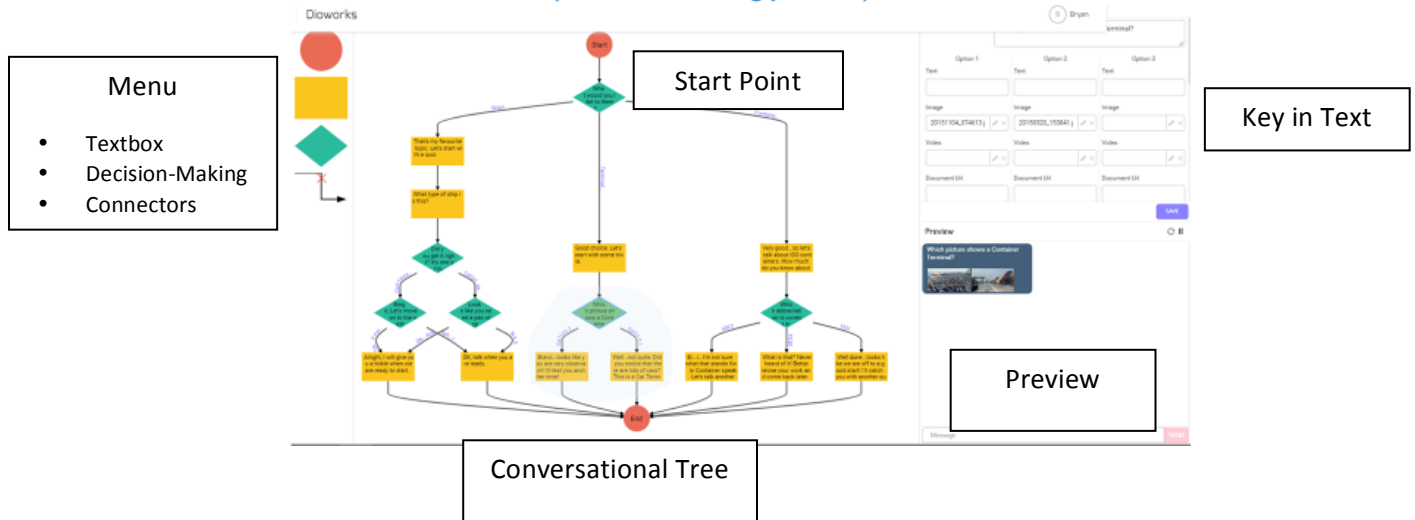
The images shown here depict some of the chatbots we have created on driving theory and onboarding for enterprises. We have also created chatbots for learning customer service and workplace literacy skills as well as on digital literacy. To date, the chatbots we created are flavoured with a constructivist feel whereby learners are brought through an experience before the chatbots open up for questions, not unlike what happens in class. This is based on our educational philosophy that learning is a process and an experience that needs to be carefully and intentionally mapped out.



The Future: Designing Your Own Chatbot for Learning

We would like to help shape a small part of the future by prototyping a DIY chatbot platform (see image below) that will enable educators to create their learning objects for learning. We believe that subject matter experts should be empowered to codify their expertise and share it with the rest of the world. Hence, making chatbots should be as easy as drag-and-drop. There is no need to know coding, just focus on designing the learning experience. This design process requires deep skillsets and a clear understanding of micro-learning pedagogies. The team at Dioworks Learning has moved into empowering our learners with these competencies to design chatbots for learning. I would say that this space needs to grow a lot more as there is a lot more potential to AI than meets the eye.

Chatbot Design (Create MCQ using pictures)



Conclusion

Having painted a picture of the future, we can only safely conclude that we really don't know what the future will hold but it promises to be exciting and full of possibilities. To fully embrace our future and to be ready will be our key advice to all aspiring AI-based learning technologists and educators. AI will impact how we work and inadvertently, how we learn, play and live our lives.

Spend some time thinking. It will help you decide where you want to go and if it works, join Dioworks to paint this future together, for the generations to come.

Reflection: _____

Conclusion

This short paper highlights specific developments in CET which impact educational services and products. While it is still early days for intelligent machines, there is no doubt its impact will be keenly felt in the years to come. How will the workforce make way for these machines? What will humans do as part of work? Can our educational institutions step up to the plate to equip our workforce for the age of artificial intelligence?

There are no easy answers but it is clear that there is a lot of hard work needed to prepare our workforce for tomorrow and it starts today.