IBM’s Your Learning and Watson—Together a game changer in learning
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a game changer in learning

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Executive abstract

Organizations around the globe are investing heavily to stay apace of rapidly evolving technologies. A crucial component, is the talent side of the equation. How can employees gain new skills and hone the ones they have to best align with shifting business demands?

How can a company address skill gaps – and how can they shed a ponderous, top-down approach for learning to be instead an efficient, flexible, and personalized experience for every individual in an organization?

At IBM we are taking bold steps to re-define the prevalent practices on skills and careers with Your Learning – we use Watson technology to arm 380,000+ IBMers around the world with the ability to access, track, interact, and socialize skills development through a next generation digital learning experience platform. It is a game changer to reimagine the global skills development dilemma.

At anytime, anywhere, IBMers use their smartphones, tablets, and other digital devices to tap IBM’s Your Learning to sift through learning of all types – micro-courses, videos, webinars, and other rich content, and track down in-person opportunities for coaching and mentoring.

As Watson (IBM’s powerhouse cognitive computing engine) learns more about each unique learner, it provides more relevant advice. This aids business units to monitor what learning is consumed, promote learning that is personalized, and determine which offerings are best supporting their needs. Behind the well-designed experience of Your Learning are the answers to a looming problem for companies who strive to stay current.

This white paper is focused on 3 points:

1. Skills – the epic skills dilemma creating a headache and reboot perspective for the C-Suite and the emerging trend of the multi-dimensional role facing employees and the latest educational strategy set in place by IBM to tap into the “new collar” worker talent pool.

2. Technology – Watson technology, what it is and how it is combined with our learning platform to deliver a quintessential ecosystem to address and close the pressing demand for new skills in the workplace.

3. User experience – keeping the user in the center of all our decisions and how Design Thinking principles apply to capturing and delighting the learning experience.

This paper is second in a series of publications from IBM Learning Digital Press. Allow us to introduce Watson technology and the way we believe it is a game changer in learning.
This white paper lays out IBM's framework for using a digital learning experience platform to accelerate skills needed in today's workplace.

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The epic skills dilemma

Digital technologies whilst deeply transformational, are creating an enormous impact on the types of workforce skills demanded by various industries. To gauge current skills challenges and assess future needs, the IBM Institute for Business Value in cooperation with Oxford Economics surveyed more than 5,600 global executives representing 18 industries and 48 countries. Survey responses illustrate unprecedented changes occurring across industries worldwide, as well as technology’s influence on consumers. Many business leaders realize their structures and processes need to dramatically change to maintain and advance their competitive edge in the marketplace.

- 60% of executives struggle to keep workforce skills current and relevant in the face of rapid digital transformation.
- 80% indicate competition is coming from new and unexpected sources.
- 67% say that traditional boundaries between industries are blurring.
- 75% of global business, government and higher education leaders believe that customer buying behavior is shifting from strictly product/service to an experience basis.

Facing the storm
Navigating the global skills crisis

The rapid advancement of technology, economic globalization and industry disruption are creating a perfect storm that is impacting skills.

Factors impacting skills demand in the next 5 years:

- Advances in industry-specific technology: 69%
- Advances in general technology: 65%
- Expanded trade and global economic specialization: 64%
- Economic globalization and changing competitive pressures: 63%
- Changes in industry business/operating models: 60%
- Changes in regulatory requirements: 60%
- Artificial intelligence and cognitive computing: 50%

Most executives cite major challenges in finding workers with required skills.

- 51% of industry executives cite finding appropriately skilled workers in local markets as the greatest challenge related skills.
- 71% of corporate recruiters indicate they cannot find applicants with sufficient practical experience.
Facing the storm
Navigating the global skills crisis

The rapid advancement of technology, economic globalization and industry disruption are creating a perfect storm that is impacting skills.

Most critical workforce skills.

Employers are overwhelmingly trying to address a workforce whose expertise have not kept pace with changing requirements. Whilst technological core capabilities (STEM) are rated as critical workforce skills, other types of soft skills are also ranked highest in critical skills in high demand (see Figure A).

Complicating the global shortage of skills is the broadening of job roles. The “multi-dimensional” job role is a dramatic shift in the definition of one single role-based contributor on a team. The shift to small, nimble teams who embrace Agile methodologies to collaborate on creating rapid prototypes, think through action management, and co-collaborate in parallel sprints and iterate on solutions based on client feedback. Leaders form teams empowered to work with extreme flexibility – using digital tools to encourage innovation, creativity and spontaneity.

In short, the “premium” is on the team. Merit, due awards, and recognition are set all at the team level. We are also witnessing a trend toward squad focused teaching and coaching, team ventures on up-skilling, and the emergence of a primary and secondary career focus. Today’s millennials have a 50% chance of living to 100+ This means it’s quite possible to have a 70 year career – and about 21 minutes per week to learn new information.

Figure A
Navigating the global crisis, from IBM institute of Business Value study, January 2017
In parallel the landscape of hiring is changing – today’s talent organization is opening the aperture on untapped pools of candidates to fill job roles. IBM is paving the way with a brand new educational strategy to capture the "new collar" worker. We believe many companies, including IBM, are looking to leverage sources of talent for new types of work. A new collar approach focuses on demonstrated skills – not on degrees. Once hired, new employees are expected to seek continuous learning and aspire to professional growth – on an ongoing basis. IBM is embracing the new collar approach as emerging technologies surface in the workplace – and rely heavily on a unique, powerful, and evolving learning experience to singularly match learning needs for each employee.

*Figure B*
New Collar Worker, from IBM Institute of Business Value study, May 2017
Top down vs digital learning platform
Transforming the fundamentals of learning through technology

Given the looming skills dilemma, the multi-dimensional job role, and the new collar worker strategy – there’s a fair demand for an entirely new paradigm for learning in today’s talent marketplace. IBM’s Your Learning is blazing a trail toward a digital learning ecosystem to help organizations and their teams adapt to this new landscape of emerging technologies and new skills requirements.

Three elements that power IBM’s Your Learning

When we talk to clients and corporate audiences about Your Learning, we’re often asked, “How did you get here?” The journey was built on design thinking principles and executed with Agile methodologies. Our laser focus is on user outcomes and it was the premise for every action we took. We measured success based on the value of what Your Learning brought to IBMers. We restlessly reinvented solutions at speed and scale based on closed loop feedback – and we worked in multidisciplinary teams including software developers, IT architects, machine learning specialists, data scientists, UX specialists, enablement, and executive sponsors. Together we marshalled three elements that tap a bonanza of learning opportunity:

1. Watson cognitive computing
2. Cloud platform and open API architecture
3. Seamless user experience

Figure C
Traditional top down vs. new digital learning ecosystem
Watson cognitive computing is the engine of Your Learning. It gathers information, and reacts to it. It builds up an understanding of what something looks like – and gets better and better at determining what unstructured data means when you connect all the context together. Over time, cognitive computing can tackle more and more complex tasks. We use Watson to understand human language, process questions just like the way people think, and Watson can instantaneously process tons of data to answer a human user need. But even most important – Watson learns from each interaction and improves its performance and value to users over time.

Watson does 3 basic things:

**Understand** – Watson receives and processes information just like humans. It can process hundreds of key words and patterns based on emotion and frequency.

**Reason** – Watson synthesizes and can form hypotheses – it creates recommendations.

**Learn** – Watson learns and improves with every interaction and outcome.
The cloud platform delivers micro services like databases, software, and analytics over the Internet – allowing access from anywhere at any time. It provides an open API to build application tools to make the Your Learning digital platform easily scalable – and encourage innovation. Organizations big and small can have their own, custom fitted learning platform environment.

And finally, Your Learning is the quintessential learner experience – it is where IBMers in a one stop place – retrieve, search, save, manage, contribute, and complete their quest to build revolving skills in the workplace. Our UX design is simple, intuitive, and goal oriented.
Recent market research shows how HR is embracing cognitive computing. A recent computing study went out to 4,000 global executives to get their sense of what cognitive computing can provide their organization and to understand their perceptions and beliefs of whether it would transform their domain. Overwhelmingly, at least 50% or more of the executives believe and recognize cognitive computing has the power to transform HR.

**Figure D**
*How cognitive computing is transforming the employee experience, IBM IBV Report—January 2017*

**HR IS EMBRACING COGNITIVE COMPUTING**

EXTENDING EXPERTISE
Transforming HR and the employee experience with cognitive computing

**UNDERSTAND**
Analyze all types and sources of data, with context, at astonishing volume and speed allowing for natural interaction.

**REASON**
Has the ability to form hypotheses, make considered arguments and prioritize recommendations to help humans make better decisions.

**LEARN**
Initially trained by experts, the system continuously ingests and accumulates while developing insight.
INVESTING IN COGNITIVE COMPUTING

Figure E
Three top investment areas in cognitive computing,
IBM IBV Report—January 2017

A learning ecosystem is the new world class standard for the talent marketplace

Today's employees work amid a sea of digital tools—there are thousands of apps and tools to support a resilient and flexible workforce. The digital landscape includes co-collaboration and cloud platform tools and has created a heightened demand for an ecosystem way of working and non-hierarchical mindset. Traditional top-down learning management, which decides who needs to know what, offers employees and employers limited options. It consumes maintenance time and is slow as sludge to adapt.

Your Learning embraces and exemplifies the ecosystem way of working and learning. It is a multi-sided platform connecting employees, stakeholders, content, services, and vendors to one centralized digital platform to serve many different roles and many different needs.

66%
Of CEOs believe cognitive computing can drive significant value in HR.

50%
Of HR executives recognize that cognitive computing has the power to transform key dimensions of HR.

54%
Of HR executives believe that cognitive computing will affect key roles in the HR organization.
Moreover, Your Learning is a one stop model – because it exists within an ecosystem; it connects vendors who have content, learners looking for content, software application for developers, and reporting capabilities for stakeholders. It’s not unlike Airbnb—Airbnb is a multisided platform – connecting all types of travelers looking for a place to stay with those offering rooms from modest to ritzy.

Our digital learning platform empowers the learner with full autonomy and continuous support creating an irresistible experience. Your Learning is now the centralized place where IBMers discover what they need to excel today to further advance their career, and is the trusted source to manage what goes into the system, connect with others to stay current, and know which learning opportunities are just right and a good fit for their preferences and personal learning needs. Our employees can watch a video on Youtube, add it to the Your Learning catalog for all to discover, watch it themselves in Your Learning, and add it to their Personal Learning Plan.

What this cloud based solution does is it alleviates the talent organization from fully “owning” the content – and puts the learner at the center of the transaction – they have social connection, they have flexibility to take and pull what they need and the drive to foster their career decisions.

Watson learns more and more exponentially about each user, and provides better recommendations to best suit their current role, level of knowledge and experience over time. Watson finds and suggests learning matched and perfectly unique to each individual IBMer. A learning ecosystem is a place where learners, decision makers, and support teams all interact across and between each other accessing services, resources and content – without really thinking about it – yet all provide value and input in a seamless and intuitive way.

The learning ecosystem diagram illustrates the breadth of our talent ecosystem – and if you look closely, you’ll see the way in which Your Learning – the multisided digital platform works. It acts like a store front – it delivers all the parts of the ecosystem. Parts such as a trusted source of content, services like Classroom Central (our classroom management tool), resources like surveys, and APIs like channels, ratings, and recommendations.
A LEARNING ECOSYSTEM FOR TALENT MARKETPLACE—THE PLAYERS

C-SUITE, SMES, TALENT ORGANIZATION & STAKEHOLDERS
Uses Watson data platform for reports
Uses micro-services to schedule classes
Adds content
Creates learning plans for competency building
Curates content
Tags content

LEARNER
Find learning
Uses Watson chat to ask questions
Creates learning plans for skills
Adds content
Tags content
Socializes Personal Recommendations
Accesses coaches

RESOURCES, SERVICES, VENDORS
Classroom central
Free content
Company acquisition content

BUSINESS OPS SQUAD
Runs platform
Uses Amplify to understand feedback
Uses Watson data platform to collect data
Manages Watson chatbot questions

DEVOPS TEAM
Creates new APIs
Manages API open architectures

A few examples of vendors:

- Coursera
- edX
- FutureLearn
- Harvard Business School
- Safari
- SkillsSoft
**YOUR LEARNING—TECHNOLOGY STACK**

We built Your Learning on a stack platform – the entire platform is connected to and runs on Bluemix. The user experience sits at the top of the stack and can change, iterate, and evolve with iterative feedback from IBMers without ever having to touch or change the software underneath it. There is minimal server-side code (for example, authentication) – the user experience is a Web/mobile based browser which makes mini-calls to the API gateway. The gateway serves as a proxy to the Bluemix components.

<table>
<thead>
<tr>
<th>What is it?</th>
<th>Where it runs</th>
<th>What it does</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Experience</td>
<td>Web browser—small amount of server-side variable injection. Nginx runs in Bluemix Mobile App</td>
<td>Renders the YL user experience</td>
</tr>
<tr>
<td>API Gateway</td>
<td>API Connect</td>
<td>Serves as proxy to services</td>
</tr>
<tr>
<td>Services</td>
<td>Libery for Java Node js</td>
<td>A Few examples:</td>
</tr>
<tr>
<td></td>
<td>Cloudant</td>
<td>Learner transcript</td>
</tr>
<tr>
<td></td>
<td>Dash DB Transaction</td>
<td>Ratings &amp; comments</td>
</tr>
<tr>
<td></td>
<td>Dash DB Analytics</td>
<td>Learning activity catalogue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Programs &amp; resources</td>
</tr>
<tr>
<td>Data Platform</td>
<td></td>
<td>Part of Watson Platform</td>
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</tbody>
</table>
Whilst IBMers see a sleek, easy-to-use and intuitive interface – there are many complex components humming in the background to ensure every user finds what they need. We firmly believe Your Learning is one of those rare solutions that equally gratifies employees and employers.

Our three elements – Watson cognitive computing, cloud platform & API open architecture and a super user experience connect and deliver massive amounts of information. Watson deep learning interprets data to create insights and advice. Data can be anything as simple as text, tweets, blogs images, or even videos – but as we describe to you the Your Learning platform, we intend it to be thought of at massive scale. We use Watson to harness data – and put simply – create a means to personalize every single skill, competency or task-based need an employee or business could have.

**Watson cognitive computing** is the power behind Your Learning.
Watson Data Platform is a combination of aggregating data from multiple learning systems pulled into one area – it provides analytical insights for an array of goals. Let’s say Grace, an IBMer, prefers videos over white papers; Watson learns this about Grace over time. Your Learning then offers her content based not only on her job role, but the type of content she prefers. Business stakeholders or designers use this information at an aggregate level to make decisions about what types of medium to invest in for an audience on this particular type of skill-based learning.
Watson Tag Advisor uses Watson Natural Language classifier to tag content – this makes it super-efficient to make machine-based recommendations and assist users when they search on a topic. Watson can learn to classify learning activities on a topic. For example, take for instance a topic, like “Project Management” – Watson tag advisor learns over time how to identify whether learning activities are about project management, yes or no. Watson Tag Advisor can either (instead of a SME) automatically tag – OR – it can give a “very highly recommended” as being tagged on project management. This saves time for the SME. In the past, SMEs had to manually assign and review tags within a course catalogue. With Watson, SMEs now automate this task. The tagging runs automatically and the SME acts as an approver. It makes their job much easier and efficient.
Smarter Recommendations

Smarter recommendations just like Amazon® does with its recommendations for books, we create recommendations based on past learner history, job role and we create correlations based on usage patterns. For example, if Grace liked a course on Bluemix and she completed a course on Machine Learning – cognitive computing creates a relationship between these data entities and prescribes for Grace Python and Data Mining. Grace can simply add these to her learning plan – just like adding them to an online shopping cart.
Amplify is a service to curate and categorize comments sent in by learners. Amplify uses Watson Natural Language Classifier to understand the comments, classify them, and take action.

If Grace encounters a broken link during her learning module, she can quickly send feedback via her chat bot to get it fixed promptly. A CLO can gain insight around learning relevancy by the sentiment analysis Watson provides.
Watson Analytics is a seamless way to discover patterns, correlations, meaning and insights. This is a powerful way to mine data and then display a visual depiction whether the data is large and complex or small and simple. Watson Analytics can mine data based on a hypothesis or question. For example, a business might need to know whether a skill gap is closed due to a learning requirement. The question could be, “How many employees complete an end-of-course evaluation score of 80% or higher?” Watson Analytics can harness data in a very short amount of time and present back to you a visual depiction of what it finds.
Watson Conversation Services

Hi, I am Watson, I am here to help!

Watson Conversation Services uses Watson Conversation as a chat bot to answer IBMers’ questions about our event scheduling tool. This chat bot has reduced the number of questions once answered by humans by 90% - and provides immediate answers 24 x 7. Grace has a question about adding her subject matter experts as speakers for the event. She types in her question to Watson, and within seconds she’s able to finish her task – in some cases, we see users say “thank you!” after they finish an interaction with Watson.
**API Open Architecture** is the beauty behind our killer technical solution – essentially we’ve created the means to add, upgrade and swap out components in a breeze. The API focuses getting data and posting data – and there are business rules around how to post it and security rules around who can access the data. In Your Learning we have different uses of data – using same data but different user experiences around the data. The interfaces communicate through the API gateway – and services interact with the data platform. The business value of the API is to make it really easy and low risk to change our user experience and it is low risk to change the UI without worrying about the service-based architecture. Another business value is unexpected innovation that can come about from other groups that use or access your services. Other groups can use our services and do very innovative things with them.

We built our entire digital learning platform on an API “micro-service” model. What this does is create a super curator model for the learner – by making minimal calls to get data. What this means in “non-technical” terms is any data that is retrieved is from very small API calls, or a micro-service architecture. A micro-service is a design philosophy that says rather than having a few big services you’re better off having lots of little services and assemble them as needed during run-time.

This is very important for IBM — with 4.5 million page views a month, translates to 45 million service calls per month. This is the treasure behind micro-services. For micro-services to work, you need a very responsive API framework – the illustration below shows our API framework.

API open architecture is one key principle in addressing the skills dilemma – it provides talent organizations the ability to create small learning services as new skills in the workplace emerge – and just as importantly to sunset services when skills associated with a content portfolio are no longer needed or are outdated.

Your Learning delivers an unprecedented learning experience for IBMers – whether users are at their desks, on smartphones, or in the airport. For Grace, this means logging into her personal Your Learning and browsing through channels of learning chosen just for her, based on her job role and what she searched in her history. Grace’s view of Your Learning changes with her interests as they evolve. Her personal recommendations become more attuned – and Grace can “talk” with Watson too – seeking guidance.

Grace has limited time per week to learn. Your Learning ensures every minute counts. Let’s assume that Grace is working a dual role – as an offering manager and a marketing campaign specialist. Your Learning interprets data based on Grace’s job role profile and creates relationships between terms for offering manager content and marketing specialist content. Your Learning personalizes and tailors Grace’s experience via deep learning, social remarks from previous IBMers in the same role, and analytics on content unique for Grace’s needs.
We have never seen businesses challenged as they are today with renewed skill requirements and user expectations for a digital learning experience. Traditional models of corporate learning cannot keep pace. Digital technology and tools can be used to create a personalized learning experience that puts learners in control to advance their careers. We are very enthusiastic about the learning ecosystem and Your Learning digital platform we have built in IBM.

Conclusion and outlook

We are in an unmatched era where traditional models around learning and engagement have transformed to a ubiquitous and personalized digital learning experience. We believe Your Learning solves the skills dilemma facing talented organizations today by giving employees the cognitive roadmaps they need to stay ahead of the curve.
The study team

Our squad is a team of technologists, educators, consultants and brand and communication experts who envision the next generation of a digital learning experience platform revolution.

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Gordon Fuller, Director Global Learning Design & Development
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