

# MIX & MATCH. The research, development and design of a system to optimize working relationships within and between fashion enterprises and educational institutions in Shanghai

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## ABSTRACT:

The saying “To be a graduate is to be unemployed” reflects the fierce competition for limited employment opportunities. This is especially the case for fashion design graduates in China. Correspondingly, it is difficult for the industry to find graduates with a suitable profile to suit the range of vacancies. Moreover, this situation suggests a problematic alignment between the requirements of the fashion industry and the objectives of fashion design education.

In an effort to address what can be seen as constraining gaps in working relationships between fashion industry stakeholder, this paper describes the co creation of a prototype web-based Community of Practice(CoP) service. A general Human Centered Design approach in line with Bezzera’s (2005) innovative process map underpins this project throughout. The resulting new service innovation is based on a unique characteristic match making engine, Mix and Match, which connect stakeholders across the sector. The service, amongst other functions also integrates and links, career-oriented assignments and online portfolios.

## INTRODUCTION

### 1. THE FASHION INDUSTRY AND DESIGN EDUCATION. MAPPING THE CONTEXT

Building on China’s enthusiasm for economic growth, fashion design has been identified as one of the 10 major creative design industries in Shanghai (UNESCO, 2011). Moreover, The Shanghai Garment Trade Association (SGTA) has formalized efforts to promote Shanghai as one of the world’s leading fashion capitals (Ballard & Alon, 2005). To some extent, this is undoubtedly good news to both fashion industry and tertiary fashion institutions. It will accelerate the development of the industry as well as create more vocational opportunities within the institution. However, that there is a deep division, or gap between academia and industry has been a widely accepted but unspoken perception in the recruitment market. Whether graduates have academic knowledge and skills sufficient to meet the expectations of industry has become a matter of contention.

Many industry employers exert pressure on universities to improve graduates’ vocational and social skills. A study of 350 graduate recruiters found that nearly a quarter were unable to find suitable candidates to fill specialized vacancies (Branine, 2008). As with graduates from any higher education institution, graduates of fashion design are usually novices in the fashion industry. In an online survey of 1000 employers from the UK fashion industry in 2008 and 2009, for instance, in the area of design and sourcing of materials and components, most interviewees agree that graduates are often lacking those skills (Williams, 2009). The international complaint of that what students are taught does not prepare them for the needs of fashion industry is echoed in Shanghai.

This situation suggests a generic and problematic alignment between the requirements of the fashion industry and the objectives of fashion design education.

## 1.1 FACTORS CONTRIBUTING TO THE GAP

### 1.1.1 THE RELATIONSHIP BETWEEN SKILLS AND ACADEMIC KNOWLEDGE

Skills are not separate from knowledge, workplace skills are practiced from a base of academic knowledge (Standish, 2012). In design education, however, given the restrictions of education, academia can never fully replicate an industry-based workplace experience, Daniel Boyarski (1998), professor of Design at Pittsburgh's Carnegie Mellon University suggested. Graduates' education, skills and knowledge are specific to their area of study. Some recruiters argue that "skills needed in industry are simply not taught in universities (Saminather, 2006)." "It's not until they engage with industry, through internships and work experience, that they begin to understand how their specific talents can potentially be applied to the workforce. And, getting the chance to see the business of fashion in action makes their education come to life. (Sep2010, Vol. 43, Issue 8) (Taylor, 2010) Many critics from fashion industry suggest that tertiary education requires updating to reflect recent innovations of the industry. "We are still educating people for a world that is disappearing." (Royal Society of Arts) (Standish, 2012)

### 1.1.2 THE PERSPECTIVES OF THE FASHION DESIGN STUDENTS

Nevertheless, student's motivation and willingness to gain practical knowledge can also influence obtaining employment. The traditional Chinese selection system of students whose major is art and design (Figure1) allows no opportunity to measure the aptitude of each student to fashion and fashion design. Accordingly, some of the students who are enrolled in fashion school are not really interested in fashion design, but only in obtaining a university qualification, a bachelor degree, and not a design-related job after graduation. It is challenging for the students themselves to go outside their institution to build a broad industry network and gain practical experience (ACEM, 2012). Students also argued that only one or two top students will be offered real work recommendations from lecturers.

### 1.1.3 STUDENTS AND THE FASHION INDUSTRY

Under the current competitive market conditions, the operations of industries are more profit-driven rather than by social responsibilities. In most fashion businesses, supervising students is perceived as "non-productive" time. The manager of Dunedin Fashion Incubator, Tracy Kennedy says: "some enterprises just think it is wasting time to partner with the academia." Industry expects a graduate to be an employable, talented professional with working experience. However, the sole social responsibility of business is not just to increase its profits (M. Friedman, 1970), a sustainable workforce strategy should involve collaborating with universities to address skill requirements (ITFE, 2010).

## 1.2 POTENTIAL OF INTEGRATING THE INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Accordingly, the opportunity to develop an efficient and effective symbiosis between these three stakeholders, fashion design institution, fashion design students and fashion industry should have been improving. The influences and opportunities brought by new technology to the wider education environment cannot be ignored.

Latest developments in information and communication technology (ICT) have led to a variety of innovations in personal learning explorations and knowledge practice experiences (Cerratto-Pargman, Järvelä, & Milrad, 2012). Higher education has embraced the highly co-creative web 2.0 World. From the past model of "Push" to "Pull", to the latest idea of "Share" (Mcguire, 2012a), fundamental changes in knowledge sharing and management, graduate recruiting processes and the modes of community of practice have taken place through online social interaction and integration.

Pre - enrollment Service Blue Print  
 Main Idea - ART EXAM SCORE + ACADEMIC EXAM SCORE

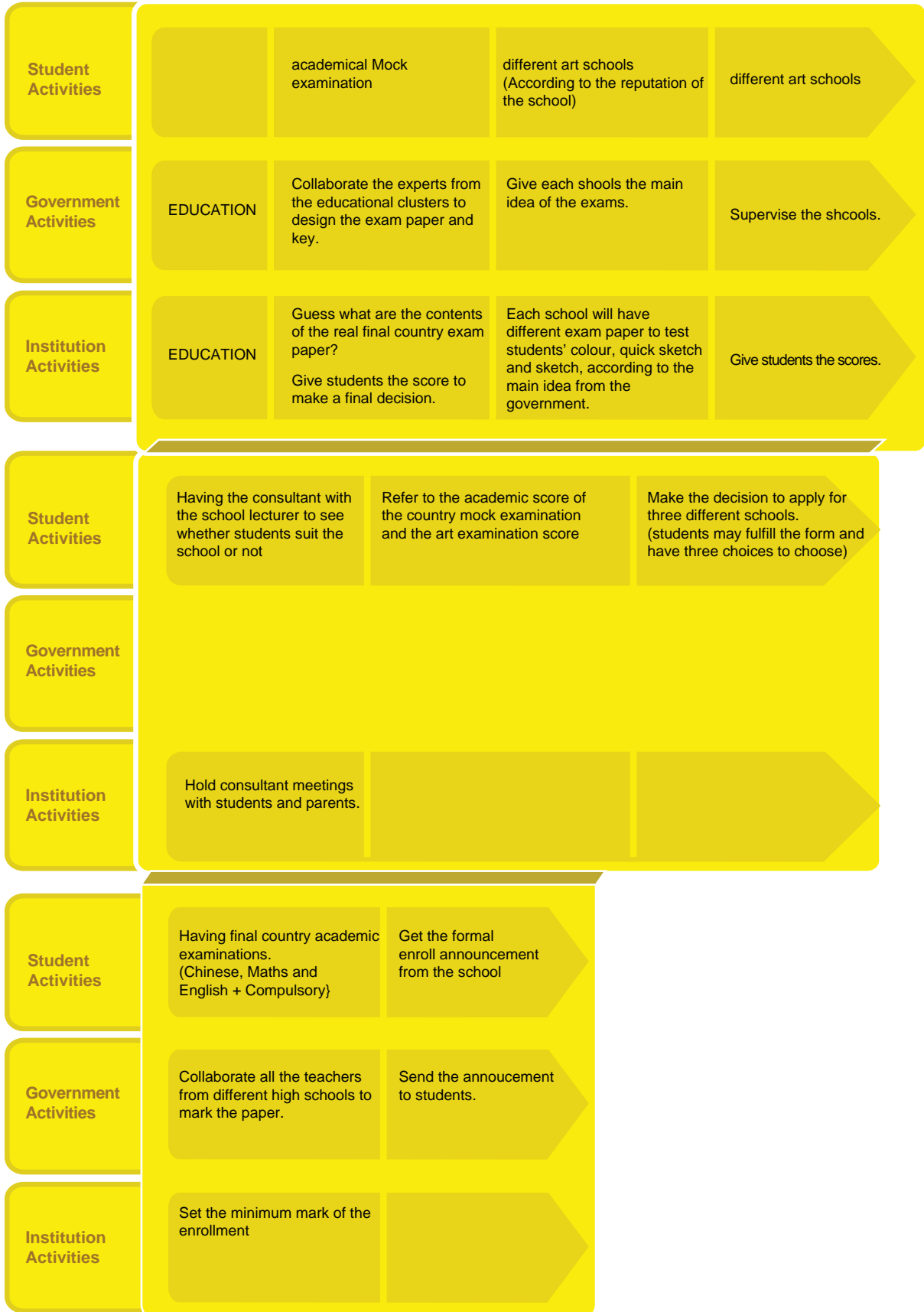


Figure 1: The traditional national enrollment process of art and design students in Shanghai (Original work by author)

Virtual e-portfolio based online social networking sites have been adopted by learners and lecturers for sharing inspiration both internationally and globally, and also for self-promotion to specific industries. The most notable examples, from Western countries include the industrial designers' community Core 77 ([www.core77.com](http://www.core77.com)) (Figure 2), creative talents online clusters known as TAXI ([www.taxi.com](http://www.taxi.com)) (Figure 3), and some specific online e-portfolio website – BEHANCE ([www.behance.net](http://www.behance.net)) (Figure 4) and Marhara. ([marhara.org](http://marhara.org)) (Figure5)



Figure 2: [www.core77.com](http://www.core77.com)



Figure 3: [www.taxi.com](http://www.taxi.com)

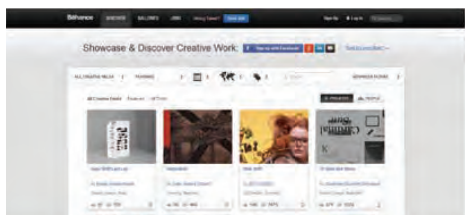


Figure 4: [www.behance.com](http://www.behance.com)



Figure 5: [www.mahara.org](http://www.mahara.org)

The spread of open online education also testifies to this new scenario. Massive Open Online Courses (MOOCs), Udacity (Figure 6), Coursera (Figure 7), MITX, OER university and edX (the collaboration of Harvard University and Stanford University) (Figure 8) have been developed in recent years. There are now 53 institutions cooperating to deliver online courses in Coursera. Nearly 1.5 million people have participated in this interactive online learning community (Fain, 2012). As Steven Leckart, the founder of Udacity, proposes, “in 50 years, there will be only 10 institutions in the world delivering higher education and Udacity has a shot at being one of them.”(Leckart, 2012)



Figure 6: [www.udacity.com](http://www.udacity.com)



Figure 7: [www.Coursera.com](http://www.Coursera.com)



Figure 8: [www.edX.com](http://www.edX.com)

“The internet is becoming a giant computer that everyone can program, providing a global infrastructure for creativity, participation, sharing, and self-organization.” (Tapscott & Williams, 2006) Optimistically, under such gradually evolving circumstances, our understanding of learning shifts from “consumption and absorption” of knowledge to “production or participation” through online connections (Brown, 2006). There will be less distinction between the role of learners and experts; users will gain more unique customized virtual collaborative learning experiences.

A report to the NZ Ministry of Education predicts that future education will involve more personalized and customized learning environment (Bolstad et al., 2012). More inspirational channels and methods of pedagogy will be produced and introduced through this open educational trend, increased work-readiness of students with improved employability skills will be delivered to the industry, and more social capital generated.

Considering all the advantages of this current situation, a vast dynamic knowledge practice and sharing ecosystem is being conceived by higher educational institutions (Wales & Baraniuk, 2008). For Shanghai Fashion Institutions and the industry, it is worthwhile and necessary to think about how to take advantage of this technological evolution to nurture and maintain vibrant communities.

## 2. SCOPING THE PROJECT. MANAGING THE DESIGN PROCESS AND DESIGN METHODS

A general Human Centered Design thinking approach underpins this project. In line with the Bezzera's (2005) innovative process map (Figure 9), from "understanding" to "innovation", initiates the whole methodology framework of this project into two main stages, "identifying the problems" and "finding the potential possibilities". Each stage is composed of two phases. Contextual immersion and research are two main activities which compose the first stage of identifying the problems and opportunities. The second stage - finding potential solutions - involves the phases of analysis and synthesis.



Figure 9: Adapted from Bezzera's innovative process map

Based on this essentially unidirectional process and diverse approaches, the overall process of this project was customized into a unique and hybridized model. Several flexible methods and tools including Service Design Thinking methods, IDEO Method Cards, Business Model Canvas were incorporated to the process.

Importantly, sections of the process were not lineal or sequential but multilayered and simultaneously enacted across the four phases. The connections and intersections of each methodology result in more robust research outcomes and insights. This is especially so between the phases of research and analysis. The iterative cycles of the process led to a range of incremental innovations (Laird, Baxter, & Wallace, 2012).

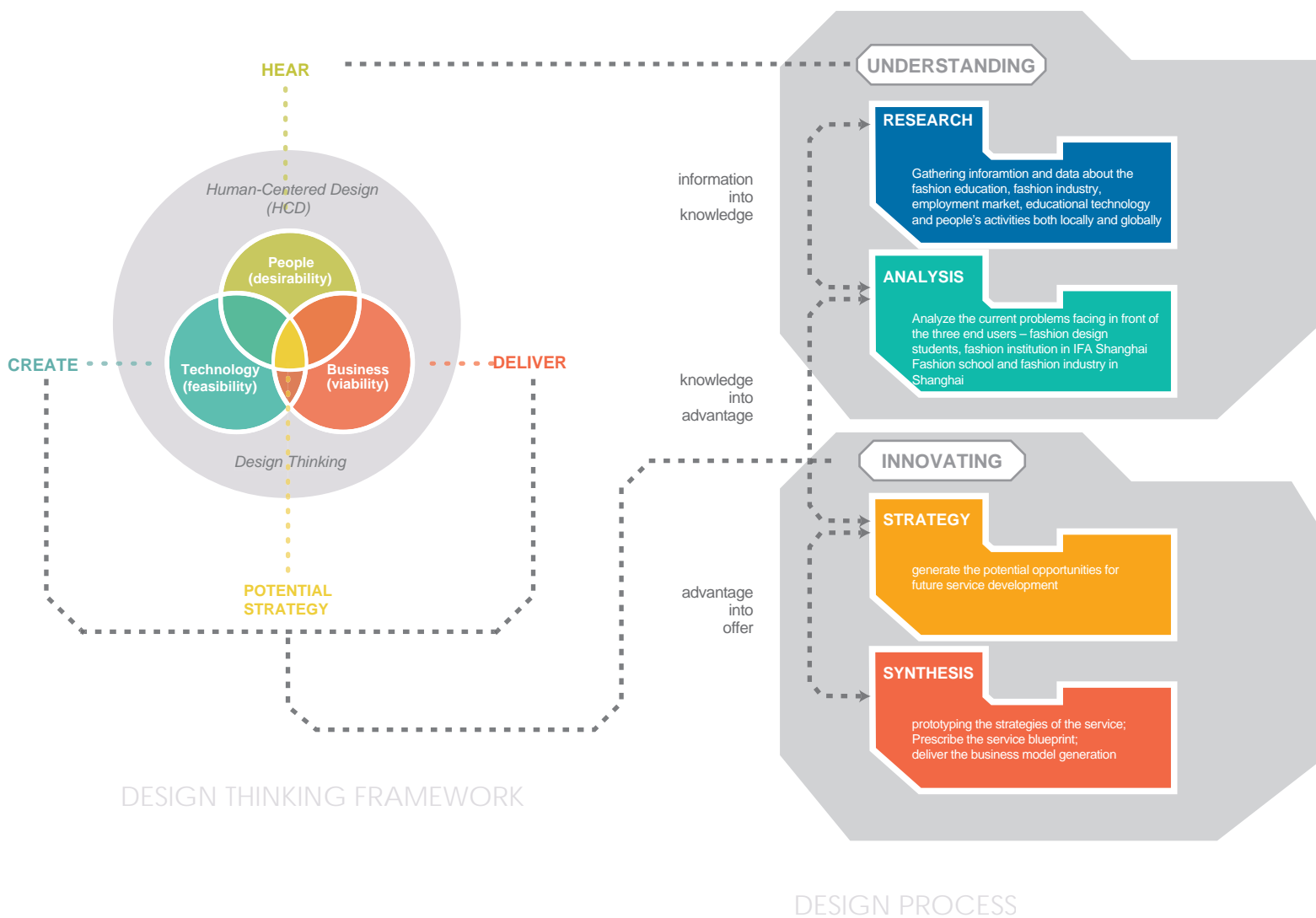
### 2.1 BEZZERA'S INNOVATIVE PROCESS MAP

Bezzera provides a framework to guide the process from "understanding" to "innovation". There are two main activities associated with the understanding stage. Firstly, this involves observing and collecting a great deal of information about the user context. Secondly, the desirable needs of end users are identified. Based on these analyses, a plurality of strategies and opportunities emerge simultaneously. Potential solutions are visualized and outlined during the activity of synthesis.

## 2.2 THE HYBRIDIXED DESIGN METHODOLOGY

On a local level, this project is focused on coordinating industry-education collaborations for the IFA fashion institution in Shanghai. The diverse needs of the different stakeholders – the fashion institution, students of fashion design and fashion industries are identified, balanced and matched to establish mutually beneficial connections among these three groups. The overall means to achieve this it is suggested, is to integrate the potential of information and communication technology(ICT) into an ideal web-based “Community of Practice”(CoP).

On a global level, the means to establish and enhance sustainable relationships between industry and academia is highly applicable to most disciplines. It is author’s contention that this formulated strategy, service blue print and associated customized design methodologies will have much wider applications.



**First phase. Contextual Immersion: focusing the project**

The ecosystem in this sense refers to the macro environment including agents of the fashion education system, the fashion industry, employment markets, educational technology and people's activities and aspirations both locally and globally.

**Second phase. Research: identifying the problem**

The research is undertaken with the stakeholders' perspectives and agendas in mind so as to generate a truly empathetic understanding of the constituent user groups.

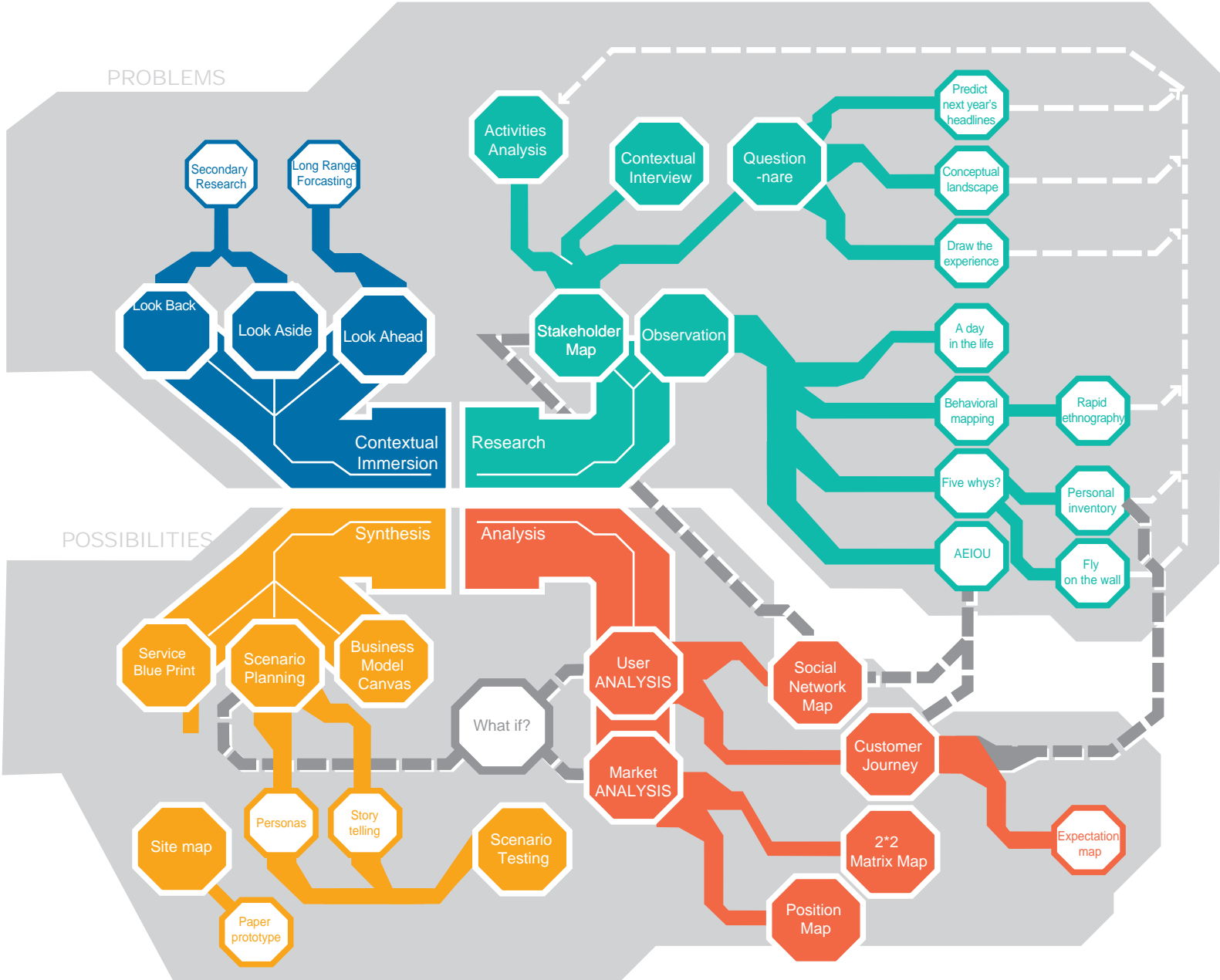


Figure 10: Hybrid methodology

### **Third phase – Analysis and Sense making – conceptual alternatives**

This phase involved the analysis and interpretation of research findings in order to create potential opportunities for future service development. Three insights were identified; potential cooperative interactions between stakeholders, the future development of educational technology was forecasted, and the emergent needs of these three groups and the way in which they could be aligned were also articulated. Consequently, existing challenges as well as new opportunities were all considered within the synthesis phase.

### **Forth phase – Synthesis and refinement - Formulating the final prototype**

This phase focuses on prototyping strategies for the overall service enterprise. Service prototyping generated through such methods as the construction of design scenarios, sketch service blueprints, and new business model visualizations.

## **3. MIX AND MATCH: AN INNOVATIVE SERVICE DESIGN BLUEPRINT**

This project sets out to explore new relationships between three user groups, fashion design students, the fashion industry and fashion design institutions. This involves developing a web-based Community of Practice (CoP) service. Three specific touchpoints provide a matching service between fashion graduates and industry, the means to generate and implement industry-education collaborative project, and the framework for students to develop online portfolios throughout their undergraduate program.

It is envisaged that the benefits of this service will enable the following: 1. Fashion design students will customize their own personal learning environment to match their future potential career path, using a myriad of career-oriented projects and internships. 2. The fashion design industry will be more efficiently and accurately matched with appropriate graduates. 3. Fashion design institutions will have the means to better understand the needs of both students and industry.

### **3.1 A CLOSER LOOK AT BASIC THEORIES OF THE MATCH-MAKING ENGINE: MIX AND MATCH**

Firstly, the blueprint prototypes a carefully integrated service specifically designed to meet the needs of stakeholders within education-industry ecosystems.

Secondly, while the service offers a suite of resources including the means to generate career-oriented assignments and e-portfolios, its unique characteristic is a match making engine, Mix and Match, which connects stakeholders across the sector. Importantly, Mix and Match can deal with large populations and the associated complexity and costs of decision making.

The whole match making process operates in two stages: ranking and matching. Based on the integration of two specific algorithm systems developed within decision making support software applications, these two components are applied to interactions between three significant stakeholders: matching future career development of fashion design students, matching career-oriented assignments to the students and internship matching with a suitable industry position.

#### **3.1.1 THE RANKING ALGORITHM. 1000 MINDS: RANKING STAKEHOLDER PREFERENCES**

Ranking stakeholder preferences is the fundamental stage of the whole match making process. The key idea of this stage is based on the algorithm system called PAPRIKA (Hansen & Ombler, 2008): 'Potentially All Pairwise RanKings of all possible Alternatives' which is proven tool utilized within decision making platforms, such as 1000Minds ([www.1000minds.com](http://www.1000minds.com)) and Sawtooth (<http://www.sawtoothsoftware.com/>).

While there are many decision making systems in the world, most of them are based on (MCDM) and ConJoint Analysis. However, 1000minds is acknowledged by most of the users globally as a new and user friendly approach ("Comparison of decision-making software," 2012) (Figure 11). Three main attributes: criteria, weights and alternatives, which enables people to make sound decisions efficiently and transparently. In this way, fashion sector users for example can build specific 'Decision Models'. Precise ranking of preferences of each stakeholder in this manner is essential in providing consistent and comparable profiles used in the matching process.





Figure 11: Software of Decision making (original work by author)

Software	Supported MCDA method(s)	Pairwise comparison	Time analysis	Sensitivity analysis	Group evaluation	Risk management	Web-based version
1000Minds	PAPRIKA	Yes	No	Yes	Yes	No	Yes
Analytica		No	Yes	Yes	No	Yes	Yes
Choosetools	PROMETHEE	Yes	No	Yes	Yes	Yes	Yes
Criterion DecisionPlus	AHP, SMART	Yes	No	Yes	No	Yes	No
Decision Lens	AHP, ANP	Yes		Yes	Yes		Yes
D-Sight	MAUT, PROMETHEE	Yes	No	Yes	Yes	Yes	Yes
Expert Choice	AHP	Yes	No	Yes	Yes	Yes	Yes
Hiview3		No	No	Yes	Yes	No	No
MakeItRational	AHP	Yes	No	Yes	Yes	No	Yes
MindDecider	AHP	No	Yes	Yes	Yes	Yes	No
TreeAge Pro		No	No	Yes	No	Yes	No

Figure 12: Comparison of decision-making software

### 3.1.2 THE MATCHING ALGORITHM: GALE-SHAPELY "DEFERRED ACCEPTANCE" ALGORITHM: MATCHING STAKEHOLDER PREFERENCES

The main opportunity to support complex match making decisions involving large numbers of individuals agencies and associated criteria was identified in the application of the Gale-Shapely Algorithm (RSAOS, 2012b). The significant advances and broad implementation of the idea supporting this algorithm theory has afforded the 2012 Nobel Prize in Economics and Engineering to the two key developers.

The whole matching process is centralized in a matching mechanism or "central clearinghouse" and separated into two main phases: the initial editing of rankings and the allocation of stable matches (Roth, 1984). "Stable" allocation describes a situation "where no individuals perceive any gains from further trade" (RSAOS, 2012a). For instance, each student will be matched to an opportunity for either internship, or career-related assignments or career interview according to their ranking. Each industry recruiter will be recommended suitable students which meet the requirements of their employment. At this stage, everyone should be satisfied.

### 3.2 RANKING AND MATCH-MAKING THEORIES UTILIZED WITHIN THIS PROJECT

The innovative aspect of this operational solution is in the close integration of two previously unrelated tools generated from two distinct theoretical frameworks to conduct the whole Mix and Match Process. In this respect the blueprint for the service is unique and comprehensive. Importantly, by bringing in the PAPRIKA decision making support software into the initial ranking phase of Gale-Shapely matching algorithm, the ranking/matching process is made much more transparent and decisions made with this support easily accountable. This service has the capacity to generate consensus, improve communication and understanding across the sector and lead to a more stable match making ecosystem.

While there are other areas of impact where the match making engine may be applied, three have been identified as significant interactions within the fashion design education/industry sector: matching industry-related internships to the fashion design students, matching career – oriented projects to the fashion design students, matching students to fashion design industry roles.

#### 3.2.1 SITUATION ONE: RANKING FUTURE CAREER ORIENTATIONS FOR FASHION DESIGN STUDENTS

From the point of view of education institutions, the unique functionality of this web-based community will help fashion students identify their special professional talents from the first year they enroll in fashion school.

At the initial ranking stage, students order quantitative and qualitative criteria which reflect their interests, such as different styles of fashion design, the desire of being a buyer or different professional roles and interests. At the same time, the institutions will develop alternative offerings so as to customize a personal learning environment for each student. Using student career interests and abilities listed, 1000Minds service will be used to produce a ranking list for students to make decisions on future professional characteristics development. The service also encourages students to think about academic process in relation to career development and for institutions to monitor student progress.

#### 3.2.2 SITUATION TWO: MATCHING STUDENTS TO INDUSTRY POSITIONS

The goal in this situation is to achieve a stable match between each student seeking employment and industry. The key to achieving this is defining and ranking desired conditions, skills, interests, ability and knowledge by both eligible students and industry recruiters.

Ranking of preferences for each stakeholder are generated by the 1000Minds ranking algorithm, and then entered into the Gale-Shapely algorithm to establish the best pairing (Figure 13-16).

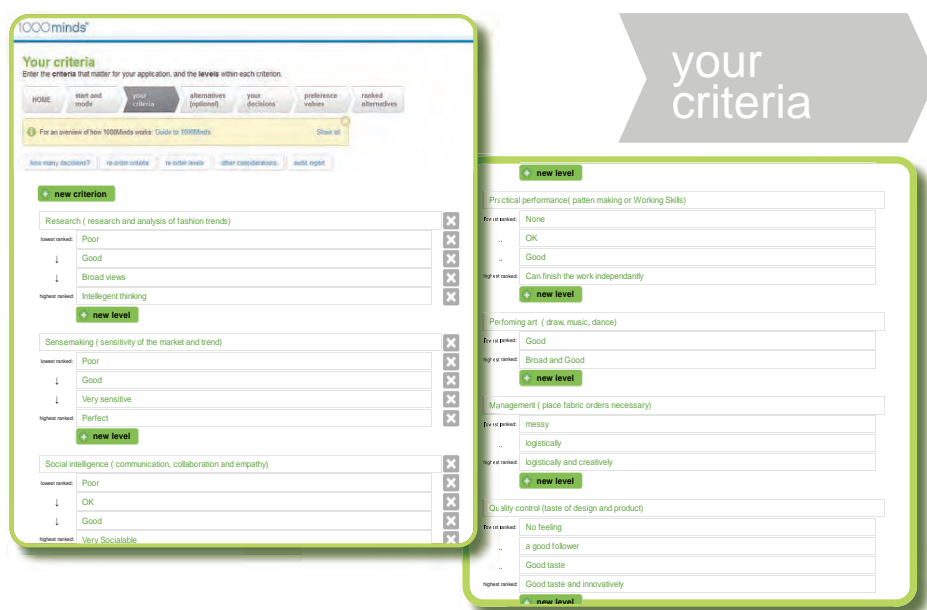


Figure 13: Adapted from 1000Minds - Decision making of criteria, redesigned by author

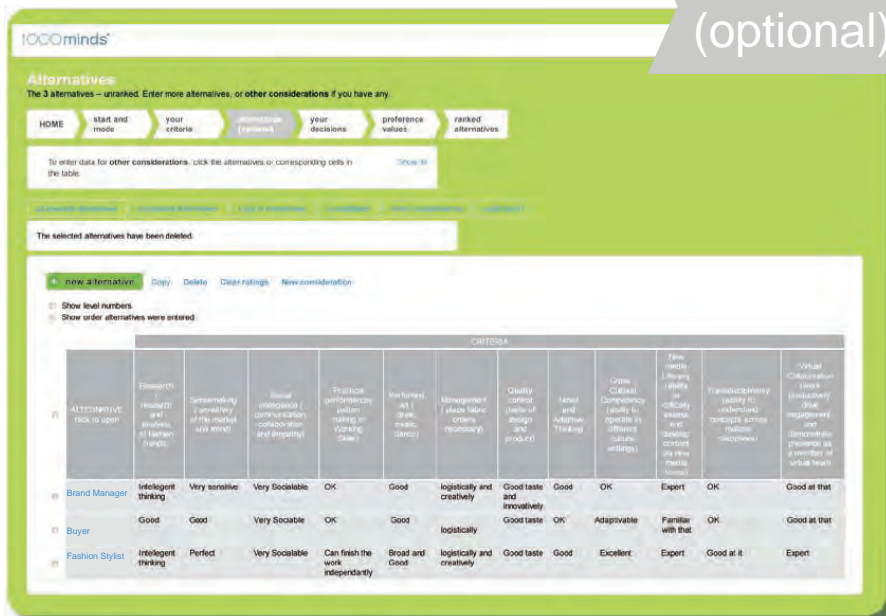


Figure 14: Adapted from 1000Minds - Decision making of alternatives, redesigned by author

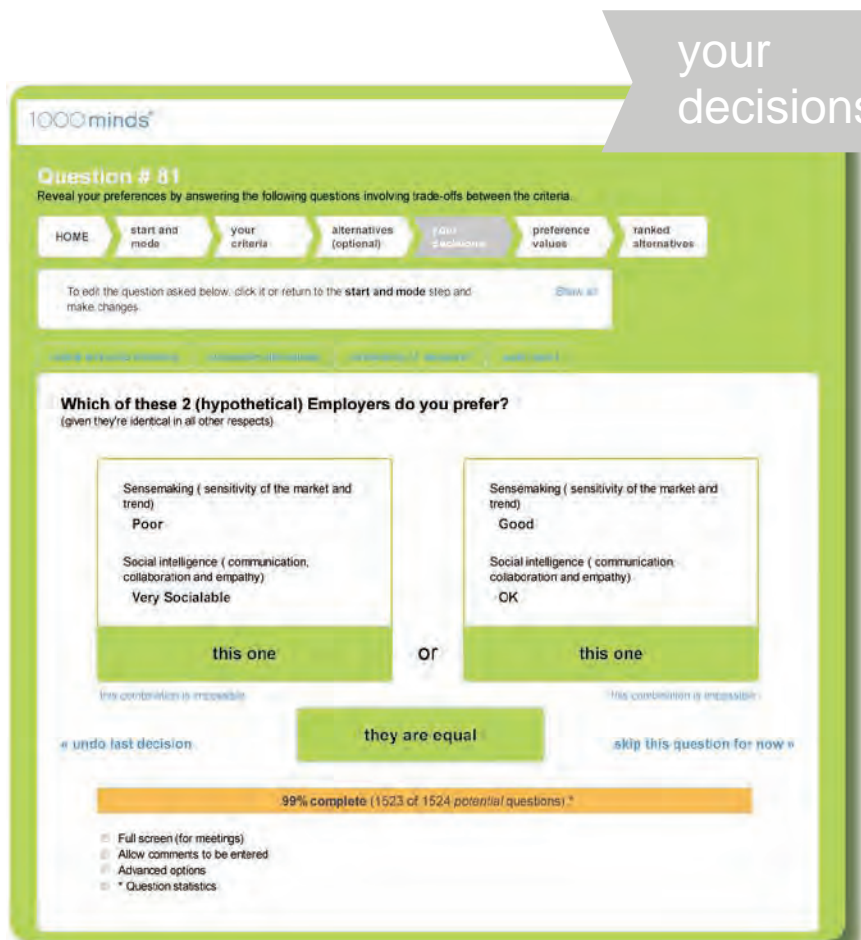


Figure 15: Adapted from 1000Minds - Decision making of weights, redesigned by author

# preference values

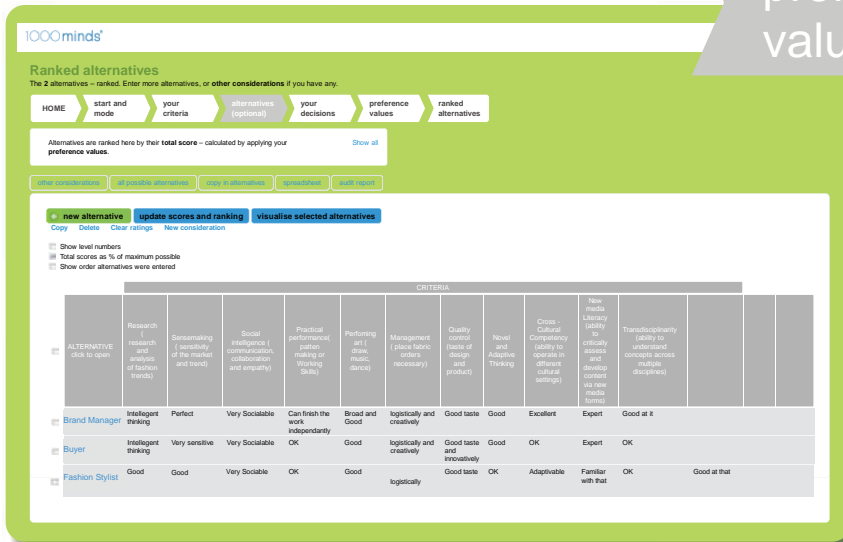


Figure 16: Adapted from 1000Minds -Ranked alternatives, redesigned by author

As matches are established between student and industry positions, these are then removed from subsequent matching operations, until all available positions filled.

The basic mechanics of the matching process is described below (Figure 17):

The whole matching process is centralized in the “Mix and Match central clearinghouse”. The first step of the matching phase (the 1: 1 step) checks to see if there are any fashion design students and the fashion industry programs that are top ranked in one another's ranking. (If a program  $h_i$  has a quota of  $q_i$ , then the  $q_i$  highest students in its ranking are top ranked.) If no such matches are found, the matching phase proceeds to the 2: 1 step, at which the second-ranked fashion industry program on each student's ranking is compared with the top-ranked students on that program's ranking. At any step, when no matches are found the algorithm proceeds to the next step, so the generic  $k: 1$  step of the matching phase seeks to find student-industry program pairs such that the student is top ranked on the program's ranking and the program is  $k$ th ranked by the student. At any step where such matches are found, the algorithm proceeds to the tentative-assignment-and-update phase.

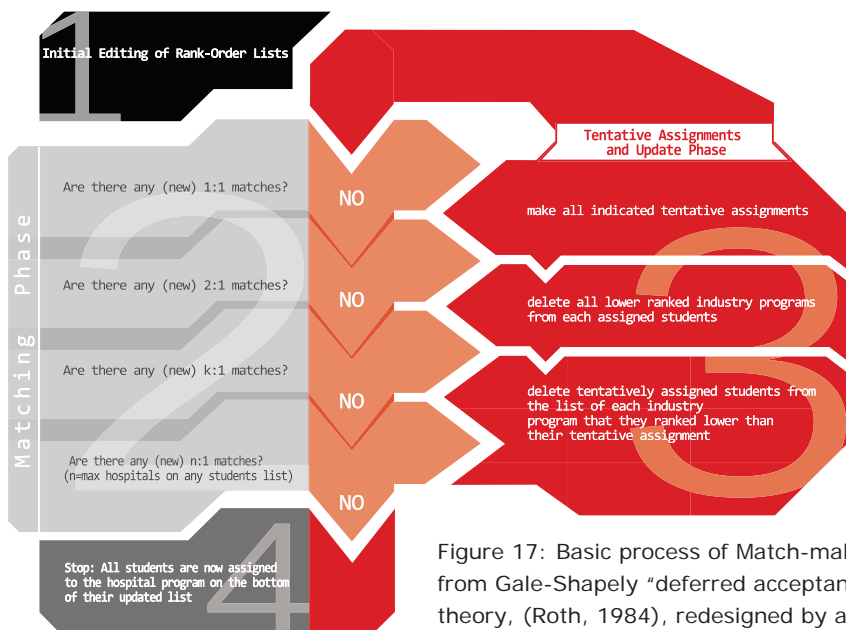
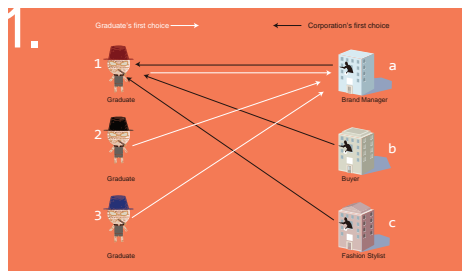


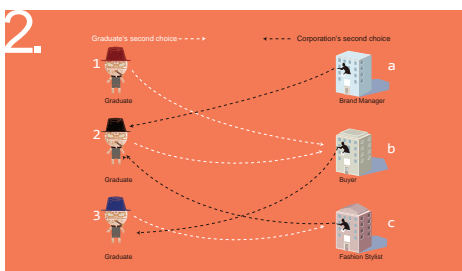
Figure 17: Basic process of Match-making, adapted from Gale-Shapely “deferred acceptance” algorithm theory, (Roth, 1984), redesigned by author

In the tentative assignment and update phase, with deleting all the graduates who have been tentatively assigned, a new ranking list will be updated which contributes to a new match phase.



1. Fashion design graduates offer themselves through their rankings to the matching process. At the same time, the industry also offers their preferences for matching (Figure 18).

Figure 18: Match-making process of industry positions - 1, adapted from Gale-Shapely match process, redesigned by author



2. In the first matching round, the successful pairing is established, and successful combination is removed from subsequent matching rounds. This process is repeated until trades cease. At this stage, stable matches are constructed and formal negotiations between the candidates and employers begin (Figure 19).

Figure 19: Match-making process of industry positions- 2, adapted from Gale-Shapely match process, redesigned by author

This overall process results in a more optimal match making outcome between individual students and industry. An additional bonus is that academics are able to utilize industry requirements recorded in the matching process to inform ongoing educational development.

### 3.3.3 SITUATION THREE: MATCHING STUDENTS TO INTERNSHIPS AND CAREER – ORIENTED ASSIGNMENTS

Service touchpoints, internships and career-oriented assignments, are co-coordinated between the fashion design industry and institutions. In order to construct a customized personal learning environment for the students, matching students to the most suitable professional experience is one of the central goals of this matching stage.

Firstly, the institution and industry will collaboratively rank their requirements of the students relating to the criteria of the internships and projects. Then the 1000Minds will generate ranking lists of students who meet their requirements. Meanwhile, students will be provided ranking lists based on the projects or internships. Secondly, these ranking lists will be submitted into the Mix & Match central clearinghouse, and through the Gale – Shapley Algorithm process, each student will be matched with a suitable internship or project efficiently and effectively.

This involves the same operational steps as the situation 2 of matching students to the suitable internship program and career-oriented assignments.

Through this interaction, undergraduate students, learn more about the industry and its opportunities from an earlier stage. This dynamic experience leads to the matching process being updated continuously. Hence, more professional skills and knowledge will be obtained during each student's personal learning journey.

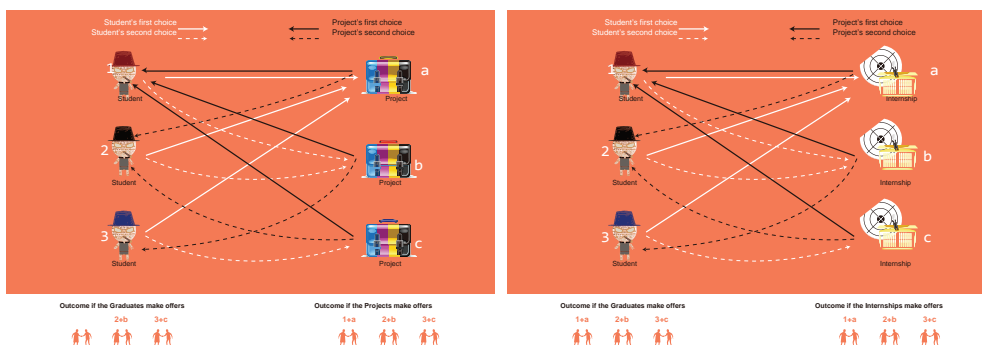


Figure 20: Match-making internships and career – oriented assignments adapted from Gale-Shapely match process, redesigned by author

## CONCLUSION

The strategic plan and framework of this project have been enthusiastically received by the Shanghai fashion design institution (IFA), and implementation has begun. Xiaoming Zhou, the head of (IFA), verified that, "it is the future trend for the industry-education collaborations. Actually, I have talked to key business people and they are keen to be closely involved in this project." Some of the students in IFA on hearing about the project were surprised; they said, "this is interesting, I'd love to be part of it!" One of a graduates, who owns the fashion brand 80's, said that, "It is essential for the school to build a platform, which is to connect the students and industry people. I wished that resource was available when I was in the school."

Engineering and software programmers have been recruited in the last year, and the hardware system for hosting and delivery this service has been procured. The school has dedicated a studio in the creative building of IFA for the project. A working group of 5 students have also been recruited. Follow the plan, all the design handbooks of each graduate in IFA from year 2002 to 2012 has been scanned and input into the server.

Importantly, the school had signed contracts with 23 fashion companies in Shanghai, establishing the industry- education network and their cooperation. It is safe to predict that the future implementation of this project is not only assured but also on a more collaborative and grander scale than originally envisaged.

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