A Semantic Web Model for a Student Prospectus

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Abstract

Universities provide the pathway for high-level jobs and the required training and education from teaching activities. Universities play a vital role in distributing knowledge, improved skill sets, different mindsets from research, education, and technology. Universities are like one big community providing new knowledge and skills to raise awareness in public for informed decision making and responsible behaviour. Universities help in the processes of sustainable development and social change. They have been assigned the most important task of developing highly skilled students and an incredible range of research to meet perceived targets. In this Project Proposal, the primary focus will be to design and implement a Semantic Web Model for a Student Prospectus.

The thesis includes the implementation of the ontology and the evaluation results in the discussion of the results section. For accuracy, eleven students' results were evaluated, expected vs actual results was explored, and students were given their suitable university destination. The domain coverage allowed participants to provide their feedback, resulting in a better semantic model. The results are seen in the discussion, and screenshots can be seen in the Appendix. Overall, this project was successful. Students were given results via the ontology, and further changes were made.

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1. Introduction

As a student, experiencing the phase from higher education to University was very difficult. Many factors had to be acknowledged, such as choosing the right University, the course itself, deciding where to live and following friends, whether it is the right decision or is my future more critical?

"College and uni is a time for you to grow as a person — you're free to experiment and find yourself. I wouldn't be who I am today if I had followed my friends to college!" (Sin, N 2018). Students need to understand the fundamentals of a university before making a choice. Having been through this chapter previously, I had no idea whether Universities were ranked. I wanted to stay with my family and decided to go to a University local to me and disregard other factors. A student prospectus will allow students access to all these factors. Having no previous research into this matter, I believe this will enable students to make the right choice and balance out their options, resulting in a suitable alternative they will be pleased with.

"People's lives are transformed through Universities. They help develop the skills and knowledge of students that employers need" (Hamlyn, M 2015). The phase from higher education to University is critical for students as they jump up to higher-level education, which can be very difficult and take time for them to adapt. As Mr M Hamlyn explains, students' lives are altered as they learn and develop critical skills and new practices which make them better individuals when they graduate. The project will help nullify any students' doubts and be pleased with their final choice. The Student prospectus will allow students to apply for Universities and students who may try something different such as apprenticeships realising this may not be the right choice for their future.

The first challenge for students is applying to UCAS when they are into their last year of higher education. Many factors need to be considered when students make their five preference choices. They can make random selections or do some research upon deciding the best options. A starting point is to be 150% certain of the course studied. The following 3-4 years will be devoted to this course and many decades upon improving their craft in the chosen field. UCAS research shows us that the earlier students engage with careers information, guidance, and advice, the earlier they start preparing and making decisions of their own. (NCS, 2021). The whole point is not to force students to use the student prospectus ontology model as their final destination or choice of University. It could be used as a learning curve to understand which universities could be better choices for them or better financially.
In this project proposal, the aim is to build a Semantic web model for a student prospectus to help students identify the university suitable for them. Many factors such as a particular course, Course details, Salaries, Fees and University rankings is essential when comparing Universities. The Student prospectus will allow students to do such, as they could acquire the relevant information to their needs. For a student, it's essential to understand the right course is chosen whilst studying at the university because it will be a disaster after two to three months into the course that they want to become a lawyer instead of a Computer scientist.

When a student chooses a University, they hear the name of the university and make their choice but what isn't looked at is whether the student understands they are eligible for a University or whether that university is okay for them to undertake a course they would prefer. For example, Aston University is ranked higher than Birmingham City. However, Birmingham City is better for Computer science than Aston University. For this specific reason, a questionnaire will be conducted, and the questions will be specifically asked to understand where a student is at with their results, expected results and budget. From these results, queries can be searched into the ontology, making assumptions about which university isn't sufficient and which universities are.

1.1. Background

With competition being at its all-time high, Universities face the challenges of attracting students to join them. "Recruiting the best students and staff is only viable by having a strong reputation and a range of important things such as: making partnerships, securing funding and engaging with key stakeholders." (Ross, D 2021). These factors are reviewed by the key stakeholders involved and help build a strong reputation. Students can review these factors such as courses offered, graduate prospects, fees, University ranking, employability, and reputation. We may have a scenario where University A had the cheapest Course fees; however, their University ranking, and employability rate was very low compared to University B and C. These statistics shouldn't deter a student who isn't worried about employability rates and University ranking because they can solely focus on getting what is best for them and ensure they get the best Degree possible. However, they may not gain a competitive advantage based on the University they graduated from. Depending on the University reputation, the student has a competitive advantage: securing a job efficiently or job security and status. Overall, University reputation can change the view on employability. (Bano, Y., Vasantha, S. 2019).

Other factors such as food and accommodation are key. University may be the first time a student may live away from home. One aspect could be that a student chooses a university closer to home or whether they have friends or know other people who are going to the same University. Different cities have different rates such as food, rent, transport, and accommodation. This is another factor when deciding to choose a local university, A cost-efficient one or a best well-rounded one.

The campus could be a deciding factor when making the final decision. The look and feel could be significant; a student is most likely to spend most of their time outside lecture hours in the University. Whether studying or chilling with friends, University facilities are essential such as if a University has a gym, sports hall, cinema area or other facilities. Escape your comfort zone and meet new people. Whatever your interests and hobbies, I guarantee there will be at least one club or society connected to it at your University. (Stevenson, C 2021).

As mentioned previously, moving away from home isn't easy and could be a traumatising experience. Food is essential. Students need to consider what they will eat whilst at the campus. If they can cook, then a low budget option of cooking their meals is an option, or a cost-effective meal is an alternative that can be found on the menus. Depending on how long a student stays at the University, it is essential to track the cafeterias hours whether they are flexible. Another critical factor could include whether the menu has healthy choices and variety.

Rationale

Students need to look at the critical areas to their success, such as who is teaching my modules, whether they are top professors, and what feedback is given. Whether their assessment and feedback are helpful in providing academic support when struggling across a thorough evaluation. The learning resources are critical to a student's triumph. Does the University have a library? What online services does the University Provide? What software or eBooks are provided if required by the University? And What is the Overall Satisfaction of previous students who have previously studied at that education institute? Having mentioned Travelling previously regarding where a student will stay and live. Another factor is whether they will be travelling during studying and the cost impacts on the degree.

Transport links are very Important, the traffic during the morning rush hours, Busses near the Accommodation/University, an on-site Car park for students who can drive or a BikeShed for students who use bikes or Bicycles for transport. Having said all of this, is this all free? The individual's tab in the Semantic web Ontology will display all of these factors upon each city and University.

1.2. Aims and Objectives

The aim of this project is to design and implement a semantic model for a Student Prospectus

Objectives:

- To provide students several Universities to select from the Prospectus
- To allow Students to test the Ontology using Sparql Queries to formulate a decision.
- Evaluate the Ontology, Is the semantic model Student Prospectus helpful?

1.3. Research Questions

As part of this project proposal the following research questions needs to be addressed:

1: Benefits of the Semantic Web? How it Started?

2: How can Semantic web Modelling be used to create a Student Prospectus?3:

What types of Queries can students used to test the Ontology?

2. Literature Review

What exactly is the Semantic Web? Providing through metadata a machine-readable web," a common framework that allows data to be shared and reused across application, enterprise, and community boundaries." (O' Brien, F 2020). Semantic web ontology enables users to work and edit shared knowledge representations on the web, which is available via artificial intelligence applications, making the web content important to computers. The inventor of the world wide web Sir Tim Berner Lee, worked very hard to achieve his next big dream: the semantic web and others in the Internet Community. Sir Tim Berner Lee's vision was to make it easy to use for users. After a conversation with Tim, he is clear that the critical pieces are in order, such as the release of SPARQL specifications for developers to build robust Semantic web domains and applications. "I think... we've got all the pieces to be able to go ahead, we should be able to get huge benefits from interoperability using what we've got. So, people realize it's time just to go do it." (Miller, P 2008).

To reap the benefits of the semantic web, this can be done by applying semantics and ontologies to your business. It's like creating a brand-new Wikipedia site by referencing semantic markups and linking data with the created entities. Overall, the semantic web can boost any eCommerce strategy by taking advantage of this. This can be applied in many ways, can help boost sales, expand business reach, and gather more clicks. (Snow-Wasserman, G 2017). Instead of presenting information to humans, the OWL Web Ontology Language is used to process information content using applications.

In this past decade, a new agenda has been evolving as part of Research in what is known as the Semantic Web. This approach might be called 'Knowledge is power, but with a different significant metaphor. (Davies, J. Fensel, D. Harmelen. V, F 2003) This is how powerful the Semantic web is, as the Authors of this book mention it's as if the semantic web is compared to electricity flowing through walls, the semantic web flows through the router of the internet. An example of this is how Semantic modelling is used today. It is used in search engines such as Google, Yahoo, Mozilla, and you have apps such as Amazon using the Semantic web to put the information of products they sell online. This paper was written in 2003 and nearly two decades later. We can see the light under the tunnel ever-present. YouTube, Netflix every roam of the industry uses the Semantic web in every walk of life with the advancement of technology. "The new Semantic Web Languages bring powerful AI Concepts into contact with the Web Infrastructure that has changed the world". (Davies, J. Fensel, D. Harmelen. V, F 2003).

Creation of Ontology in Education Domain (© 2012 Education Domain Ontology) This ontology was based on the courses offered at a particular university. The University had its properties and restrictions. However, through the object and data properties, they defined the properties domain and range to select whether a student has passed, been established, or offered. This ontology has its advantages and disadvantages. There is no fee structure regarding the University. The ontology is based on one University and its courses, which shows the dept the admin has gone into the University. The ontology hasn't been tested via SPARQL queries, so there isn't a test of whether it works. The representation is excellent. My Student prospectus aims to have a similar structure with more purpose and have it evaluated and tested.

University of Birmingham (© 2022 Student Prospectus) The following reference is a university prospectus of the University of Birmingham. This prospectus includes information on all the courses offered by the University of Birmingham, the entry requirements for each subject and information about open days and past student experiences. Having reviewed the whole student prospectus, this is usually the norm; however, the Student prospectus ontology would not only have the details regarding courses offered, entry requirements but finances that would be required too. Having read through the full prospectus has given me an idea to include information regarding open days. If there is time left for this project, this would be a viable option that will provide the Student with prospectus ontology more credibility. Overall, the student ontology would help students for more Universities than just the one. This would save time for students rather than searching up each prospectus.

3. Research Methodology

Web Ontology (OWL) Language is a specific semantic language which is used to share ontologies worldwide. Ontology development is key to building a domain and addressing a significant problem which has many methodologies and tools. In this project we aim to focus in the education sector and demonstrate the development ofa Student Prospectus ontology using Protégé 5.5 editor. OWL has three sublanguages: OWL Lite, OWL DL, and OWL Full. OWL enables more machine interpretability of web content than the other languages: XML, RDF it provides moreplugins and vocabulary along with formal semantics.

SPARSQL is an RDF Query language which can efficiently extract data within the ontology hidden in different forms and stored in various formats, using snapSPARSQL query in Protege 5.5 various questions will be answered within the ontology which can evidently provide solutions to students trying to choose their University and Course. SPARSQL is more than just a query language, results can be returned in RDF formats and entities are identified by URIs.

4. Results

Implementation of the Ontology

The ontology was implemented using the protégé 5.5 editor. As mentioned previously, ontology has four phases in the developmental stage: Class Hierarchy, Object Properties, Data properties and individuals. The Class hierarchy includes the root of the Student Prospectus ontology. For example, Universities is a class, and the subclasses would be Universities in the ontology. Another example would include Person, and the subclasses would be Staff and Student. The next phase in the Web ontology is the object properties. Object properties have their relationship and domain, and ranges need to be defined. For example, each student has a name, and the name is specified by the property as hasName. Which means each student has a name. Another example would be: Students enrolls for Universities, and this property is named as enrollsFor. After the Object properties are assigned, data properties are created and assigned. Data properties define ranges between each instance that will be created. Data properties are linked to the object properties. For example, if we had to explain Ucas points and Course Fees and University Ranking: UCASTariffPoint, ukPriceAre and isRanking all have a specific range such as int, string, Datetime. The final phase of the web Ontology is the Individuals. Instances are created linking the individual or object to the subclass in the Course ontology, whether a student, staff, or University. The model Is named depending on the type. For example, Birmingham University is one of the Universities in ontology. It provides courses, has a specific fee structure, and requires certain student parameters such as Ucas points or IELTS Score. These phases are used when the refactor is started, and when Sparql queries are run, it collects data from these phases. (Appendix A, Fig 1) shows the 4 phases of the Student Prospectus Ontology.

Accuracy:

Eight students agreed to participate in this project. They were given a questionnaire to fill in, which consisted of a range of different questions to input further SPARQL queries to test the Ontology and get the best possible outcome for each Student. In the discussion of the results section, the expected outcome and the actual outcome of each Student is analysed. (Appendix A, Fig 2) Shows the Questionnaire handed out to the student.

Domain Coverage:

For further evaluation of the ontology, the second method that I used for this project was Domain Coverage: A video demo of the whole ontology was shared amongst Participants of this study, and each one of those participants was given a google forms link to fill in and answer regarding the ontology. A total of 6 questions were included in the form, which outlined whether the participants understood the ontology, whether they believe it could help a student choose the right University and Whether they would recommend the ontology to other students who are looking to study at a university soon or currently graduation college students. The form also included suggestions for improvement for what alterations they would make and any other queries they would suggest being included or any changes to the ontology. (Appendix A, Fig 3) Shows the Google Forms Questionnaire.

5. Discussion of Results

Accuracy

Expected Results

Student A

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Sports Science	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "SportsScience") }
2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£10000	SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <10000). }
3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	5.7	SELECT ?y ?IELTS where { ?y uni:MinimumIelts ?IELTS . ?y rdf:type uni:Universities }
4	Uni Budget Fee	The course fees listed from the students chosen budget	<12500	SELECT ?y ?price where { ?y uni:undergradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <12500) }
5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	N/a	Student has no interest in SSR, PR.
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.		Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix B Fig 1-4

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "SportsScience") }	YES	CambridgeUniversity UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where {
			?y uni:AvgaccommodationAre ?Accommodation .
			?y rdf:type uni:Universities
			FILTER (?Accommodation <10000).
			}
				YES	UniversityofWarwick
					AstonUniversity
					CoventryUniversity
					UniversityofBirmingham

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?IELTS where {
			?y uni:MinimumIelts ?IELTS .
			?y rdf:type uni:Universities
			}
				YES	UniversityofWarwick
					AstonUniversity
					CoventryUniversity
					UniversityofBirmingham

4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where {
			?y uni:undergradPriceAre ?price .
			?y rdf:type uni:Universities
			FILTER (?price <12500)
			}
				YES	Coventry University

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	Student has no interest in SSR, PR.	N/A	
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.	N/A	Coventry University. Cambridge was eliminated after the Accommodation budget of the student was applied and when the Uni budget was applied only Coventry University remained for Student A

Expected Results

Student B

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Biology	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Biology") }

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£13000	SELECT ?y ?Accommodation where {
				?y uni:AvgaccommodationAre ?Accommodation .
				?y rdf:type uni:Universities
				FILTER (?Accommodation <13000).
				}

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	6.6	SELECT ?y ?IELTS where {
				?y uni:MinimumIelts ?IELTS .
				?y rdf:type uni:Universities
				}

4	Uni Budget Fee	The course fees listed from the students chosen budget	<£14000	SELECT ?y ?price where {
				?y uni:undergradPriceAre ?price .
				?y rdf:type uni:Universities
				FILTER (?price <14000)
				}

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	Really Important 5 for Professor Rating	SELECT ?y ?pr where {
				?y uni:ProfRating ?pr .
				?y rdf:type uni:Universities
				}

6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	N/A	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix C, Fig 1-5

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Biology") }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where {
			?y uni:AvgaccommodationAre ?Accommodation .
			?y rdf:type uni:Universities
			FILTER (?Accommodation <13000).
			}
				YES	UniversityofWarwick
					AstonUniversity
					CoventryUniversity
					UniversityofBirmingham
					CambridgeUniversity

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?IELTS where {
			?y uni:MinimumIelts ?IELTS .
			?y rdf:type uni:Universities
			}
				YES	UniversityofWarwick
					AstonUniversity
					CoventryUniversity
					UniversityofBirmingham
					CambridgeUniversity

4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where {
			?y uni:undergradPriceAre ?price .
			?y rdf:type uni:Universities
			FILTER (?price <14000)
			}
				YES	Coventry University
					AstonUniversity
					UniversityofBirmingham

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	SELECT ?y ?pr where {
			?y uni:ProfRating ?pr .
			?y rdf:type uni:Universities
			}
				YES	Best rated university from the above is
					
					University of Birmingham.

6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice of for student.	N/A	**UniversityOfBirmingham** This student had a very good Ielts exam score which meant they were eligible for all the Universities. However, their budget was less than £14000 which meant Warwick and Cambridge Universities were eliminated thus left the 3 remaining Universities. UniversityofBirmingham had the best PR.

Expected Results

Student C

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Maths	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Maths") }

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£10000	SELECT ?y ?Accommodation where {
				?y uni:AvgaccommodationAre ?Accommodation .
				?y rdf:type uni:Universities
				FILTER (?Accommodation <10000).
				}

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	155 Ucas P	SELECT ?y ?Ucas where {
				?y uni:UCASTariffPoint ?Ucas .
				?y rdf:type uni:Universities
				}

4	Uni Budget Fee	The course fees listed from the students chosen budget	<£16000	SELECT ?y ?price where {
				?y uni:undergradPriceAre ?price .
				?y rdf:type uni:Universities
				FILTER (?price <16000)
				}

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	Really Important 5 for SSR	SELECT ?y ?SSR where {
				?y uni:StudentSatisfactionAre ?SSR .
				?y rdf:type uni:Universities
				}

6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	N/A	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix D, Fig 1-5

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Maths") }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where {
			?y uni:AvgaccommodationAre ?Accommodation .
			?y rdf:type uni:Universities
			FILTER (?Accommodation <10000).
			}
				YES	UniversityofWarwick
					AstonUniversity
					CoventryUniversity
					UniversityofBirmingham

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?Ucas where {
			?y uni:UCASTariffPoint ?Ucas .
			?y rdf:type uni:Universities
			}
				YES	UniversityofWarwick
					AstonUniversity
					CoventryUniversity
					UniversityofBirmingham

4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where {
			?y uni:undergradPriceAre ?price .
			?y rdf:type uni:Universities
			FILTER (?price <16000)
			}
				YES	Coventry University
					AstonUniversity
					UniversityofBirmingham
					UniversityofWarwick

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	SELECT ?y ?SSR where {
			?y uni:StudentSatisfactionAre ?SSR .
			?y rdf:type uni:Universities
			}
				YES	Student wanted the best university possible with the best student satisfaction rate. University of Warwick had the highest score with 79.2

6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.	N/A	Warwick University This student had a very high Ucas score which meant they were eligible for all the universities barring Cambridge. The second-best possible University for them UniversityofWarwick. They could also afford Accommodation and Course Fees.

Expected Results

Student D

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Law	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Law") }

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£7000	SELECT ?y ?Accommodation where {
				?y uni:AvgaccommodationAre ?Accommodation .
				?y rdf:type uni:Universities
				FILTER (?Accommodation <7000).
				}

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	140 Ucas P	SELECT ?y ?Ucas where {
				?y uni:UCASTariffPoint ?Ucas .
				?y rdf:type uni:Universities
				}

4	Uni Budget Fee	The course fees listed from the students chosen budget	<£14000	SELECT ?y ?price where {
				?y uni:undergradPriceAre ?price .
				?y rdf:type uni:Universities
				FILTER (?price <14000)
				}

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	N/A	N/A
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	N/A	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix E, Fig 1-4

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Law") }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where {
			?y uni:AvgaccommodationAre ?Accommodation .
			?y rdf:type uni:Universities
			FILTER (?Accommodation <7000).
			}
				YES	AstonUniversity

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?Ucas where {
			?y uni:UCASTariffPoint ?Ucas .
			?y rdf:type uni:Universities
			}
				YES	AstonUniversity
					CoventryUniversity

4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where {
			?y uni:undergradPriceAre ?price .
			?y rdf:type uni:Universities
			FILTER (?price <14000)
			}
				YES	Coventry University
					AstonUniversity
					UniversityofBirmingham

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	N/A	N/A	Student had no interest in SSR and PR. They had a low budget and wanted a university best suited for them
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.	N/A	Aston University. The student wants to study law, has a low accommodation budget after applying their required filter in the ontology it was clear Aston University is best suited for them since they are the only University offering Accommodation Under £7000.

Expected Results

Student E

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Computer Science	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " ComputerScience") }

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£12500	SELECT ?y ?Accommodation where {
				?y uni:AvgaccommodationAre ?Accommodation .
				?y rdf:type uni:Universities
				FILTER (?Accommodation <12500).
				}

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	175 Ucas P	SELECT ?y ?Ucas where {
				?y uni:UCASTariffPoint ?Ucas .
				?y rdf:type uni:Universities
				}

4	Uni Budget Fee	The course fees listed from the students chosen budget	<£24000	SELECT ?y ?price where {
				?y uni:postgradPriceAre ?price .
				?y rdf:type uni:Universities
				FILTER (?price <24000)
				}

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	Really Important 5 for SSR and PR	SELECT ?y ?SSR where {
				?y uni:StudentSatisfactionAre ?SSR .
				?y rdf:type uni:Universities
				}
				
				SELECT ?y ?PR where {
				?y uni:ProfRating ?PR .
				?y rdf:type uni:Universities
				}

6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	N/A	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix F, Fig 1-5

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " ComputerScience") }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity
2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <12500). }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity
3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?Ucas where { ?y uni:UCASTariffPoint ?Ucas . ?y rdf:type uni:Universities }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity
4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where { ?y uni:postgradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <24000) }	YES	AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity
5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	SELECT ?y ?SSR where { ?y uni:StudentSatisfactionAre ?SSR . ?y rdf:type uni:Universities } SELECT ?y ?PR where { ?y uni:ProfRating ?PR . ?y rdf:type uni:Universities }	YES	Student was very keen on a high professor rating and Student Satisfaction rate.
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.	N/A	Cambridge University This postgraduate student is very accomplished is able to go to any university barring UniversityofWarwick due to the course fees. Since the Student wants the best in class, they'll get the best in class.

Expected Results

Student F

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Medicine	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " Medicine") }

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£12500	SELECT ?y ?Accommodation where {
				?y uni:AvgaccommodationAre ?Accommodation .
				?y rdf:type uni:Universities
				FILTER (?Accommodation <12500).
				}

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	168 Ucas P	SELECT ?y ?Ucas where {
				?y uni:UCASTariffPoint ?Ucas .
				?y rdf:type uni:Universities
				}

4	Uni Budget Fee	The course fees listed from the students chosen budget	<£15000	SELECT ?y ?price where {
				?y uni:postgradPriceAre ?price .
				?y rdf:type uni:Universities
				FILTER (?price <15000)
				}

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	Really Important 5 for PR	SELECT ?y ?PR where {
				?y uni:ProfRating ?PR .
				?y rdf:type uni:Universities
				}

6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	N/A	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix G, Fig 1-5

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " Medicine") }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where {
			?y uni:AvgaccommodationAre ?Accommodation .
			?y rdf:type uni:Universities
			FILTER (?Accommodation <12500).
			}
				YES	UniversityofWarwick
					AstonUniversity
					CoventryUniversity
					UniversityofBirmingham
					CambridgeUniversity

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?Ucas where {
			?y uni:UCASTariffPoint ?Ucas .
			?y rdf:type uni:Universities
			}
				YES	UniversityofWarwick
					AstonUniversity
					CoventryUniversity
					UniversityofBirmingham
					CambridgeUniversity

4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where {
			?y uni:postgradPriceAre ?price .
			?y rdf:type uni:Universities
			FILTER (?price <15000)
			}
				YES	AstonUniversity
					CoventryUniversity
					UniversityofBirmingham

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	SELECT ?y ?PR where {
			?y uni:ProfRating ?PR .
			?y rdf:type uni:Universities
			}
				YES	Student understands Professor rating is key to his decision.

6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.	N/A	UniversityofBirmingham This postgraduate student is very accomplished is able to go to any university however they are short on course fees. Due to the budget restraint the student has 3 options in Aston, Coventry and Uob. UniversityofBirmingham has the highest Professor rating in 3.78 than the other Universities available

Expected Results

Student G

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Medicine	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " Medicine") }

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£9500	SELECT ?y ?Accommodation where {
				?y uni:AvgaccommodationAre ?Accommodation .
				?y rdf:type uni:Universities
				FILTER (?Accommodation <9500).
				}

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	140 Ucas P	SELECT ?y ?Ucas where {
				?y uni:UCASTariffPoint ?Ucas .
				?y rdf:type uni:Universities
				}

4	Uni Budget Fee	The course fees listed from the students chosen budget	<£13800	SELECT ?y ?price where {
				?y uni:postgradPriceAre ?price .
				?y rdf:type uni:Universities
				FILTER (?price <13800)
				}

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	Really Important 5 for PR	SELECT ?y ?PR where {
				?y uni:ProfRating ?PR .
				?y rdf:type uni:Universities
				}

6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	N/A	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix H, Fig 1-5

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " Medicine") }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where {
			?y uni:AvgaccommodationAre ?Accommodation .
			?y rdf:type uni:Universities
			FILTER (?Accommodation <9500).
			}
				YES	AstonUniversity
					CoventryUniversity
					UniversityofBirmingham

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?Ucas where {
			?y uni:UCASTariffPoint ?Ucas .
			?y rdf:type uni:Universities
			}
				YES	AstonUniversity
					CoventryUniversity

4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where {
			?y uni:postgradPriceAre ?price .
			?y rdf:type uni:Universities
			FILTER (?price <13800)
			}
				YES	AstonUniversity
					CoventryUniversity

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	SELECT ?y ?PR where {
			?y uni:ProfRating ?PR .
			?y rdf:type uni:Universities
			}
				YES	Student understands Professor rating is key to his decision.

6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.	N/A	AstonUniversity This postgraduate student had two university options after filtering their UCAS points. Aston University had the higher professor rating from the two resulting in a better destination for the student.

Expected Results

Student H

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Law	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " Law") }

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£10000	SELECT ?y ?Accommodation where {
				?y uni:AvgaccommodationAre ?Accommodation .
				?y rdf:type uni:Universities
				FILTER (?Accommodation <10000).
				}

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	3.7	SELECT ?y ?IELTS where {
				?y uni:MinimumIelts ?IELTS .
				?y rdf:type uni:Universities
				}

4	Uni Budget Fee	The course fees listed from the students chosen budget	<£17000	SELECT ?y ?price where {
				?y uni:postgradPriceAre ?price .
				?y rdf:type uni:Universities
				FILTER (?price <17000)
				}

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	N/a	Student not interested in Professor rating and the Student Satisfaction rates
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	N/A	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix I, Fig 1-4

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " Law") }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity
2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <10000). }	YES	AstonUniversity CoventryUniversity UniversityofBirmingham UniversityofWarwick
3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?IELTS where { ?y uni:MinimumIelts ?IELTS . ?y rdf:type uni:Universities }	YES	None
4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where { ?y uni:postgradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <17000) }	YES	AstonUniversity CoventryUniversity UniversityofBirmingham
5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	Student not interested in Professor rating and the Student Satisfaction rates	NO	Student isn't worried regarding PR and SSR.
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.	N/A	Unfortunately, this student doesn't qualify for any University because their Ilets exam score is less than the minimum requirement which is 4.5.

Expected Results

Student I

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Maths	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " Maths") }

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£7850	SELECT ?y ?Accommodation where {
				?y uni:AvgaccommodationAre ?Accommodation .
				?y rdf:type uni:Universities
				FILTER (?Accommodation <7850).
				}

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	7.0	SELECT ?y ?IELTS where {
				?y uni:MinimumIelts ?IELTS .
				?y rdf:type uni:Universities
				}

4	Uni Budget Fee	The course fees listed from the students chosen budget	<£11000	SELECT ?y ?price where {
				?y uni:postgradPriceAre ?price .
				?y rdf:type uni:Universities
				FILTER (?price <11000)
				}

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	N/a	Student not interested in Professor rating and the Student Satisfaction rates
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	N/A	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix J, Fig 1-4

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " Maths") }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where {
			?y uni:AvgaccommodationAre ?Accommodation .
			?y rdf:type uni:Universities
			FILTER (?Accommodation <7850).
			}
				YES	AstonUniversity
					CoventryUniversity

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?IELTS where {
			?y uni:MinimumIelts ?IELTS .
			?y rdf:type uni:Universities
			}
				YES	UniversityofWarwick
					AstonUniversity
					CoventryUniversity
					UniversityofBirmingham
					CambridgeUniversity

4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where {
			?y uni:postgradPriceAre ?price .
			?y rdf:type uni:Universities
			FILTER (?price <11000)
			}
				YES	CoventryUniversity

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	Student not interested in Professor rating and the Student Satisfaction rates	NO	Student isn't worried regarding PR and SSR.
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.	N/A	Very talented student, but due to their budget restraints they aren't able to get into any other Universities. They have a very high IELTS exam score which this student can be eligible for any University. Only viable options were Aston and Coventry and after querying Curse fees Coventry University is the best destination for the student.

Expected Results

Student J

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Law	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " SportsScience") }
2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£20000	SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <20000). }
3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	120	SELECT ?y ?Ucas where { ?y uni:UCASTariffPoint ?Ucas . ?y rdf:type uni:Universities }
4	Uni Budget Fee	The course fees listed from the students chosen budget	<£30000	SELECT ?y ?price where { ?y uni:postgradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <30000) }
5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	Student understands Professor rating is key to his decision.	SELECT ?y ?PR where { ?y uni:ProfRating ?PR . ?y rdf:type uni:Universities }
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	N/A	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix K, Fig 1-4

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " SportsScience") }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity
2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <20000). }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity
3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?Ucas where { ?y uni:UCASTariffPoint ?Ucas . ?y rdf:type uni:Universities }	YES	None
4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where { ?y uni:postgradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <30000) }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity
5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	SELECT ?y ?PR where { ?y uni:ProfRating ?PR . ?y rdf:type uni:Universities }	YES	Student wants the PR Ranked University.
6	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.	N/A	Unfortunately, this student doesn't qualify for any University because their UCAS points are very low. The student ca qualify for any University due to their budget however money doesn't always guarantee success.

Expected Results

Student K- After Evaluation

N	Query	Expected Result	Student Answers	Code for Query
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	Maths	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " Maths") }

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	£13000	SELECT ?y ?Accommodation where {
				?y uni:AvgaccommodationAre ?Accommodation .
				?y rdf:type uni:Universities
				FILTER (?Accommodation <13000).
				}

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	150	SELECT ?y ?Ucas where {
				?y uni:UCASTariffPoint ?Ucas .
				?y rdf:type uni:Universities
				}

4	Uni Budget Fee	The course fees listed from the students chosen budget	<£15000	SELECT ?y ?price where {
				?y uni:postgradPriceAre ?price .
				?y rdf:type uni:Universities
				FILTER (?price <15000)
				}

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	Student understands Professor rating is key to his decision.	SELECT ?y ?PR where {
				?y uni:ProfRating ?PR .
				?y rdf:type uni:Universities
				}

6	Chosen Scholarships	The chosen Schorship by the student	Academic Excellence	SELECT ?x WHERE { ?x rdfs:subClassOf uni:Scholarships FILTER regex(str(?x) , "AcademicExcellence") }
7	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	N/A	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.

Actual Results: Appendix L, Fig 1-6

N	Query	Expected Result	Code for Query	Did the query run?	Universities Available to the student at each stage.
1	What Subject/Topic would you like to study in University?	The chosen subject by the Student to Appear	SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , " Maths") }	YES	UniversityofWarwick AstonUniversity CoventryUniversity UniversityofBirmingham CambridgeUniversity

2	Accommodation Budget?	List of Accommodation places. < > than the Budget listed.	SELECT ?y ?Accommodation where {
			?y uni:AvgaccommodationAre ?Accommodation .
			?y rdf:type uni:Universities
			FILTER (?Accommodation <13000).
			}
				YES	UniversityofWarwick
					AstonUniversity
					CoventryUniversity
					UniversityofBirmingham
					CambridgeUniversity

3	UCAS/IELTS Score to be eligible for the right Uni.	Universities with the score provided.	SELECT ?y ?Ucas where {
			?y uni:UCASTariffPoint ?Ucas .
			?y rdf:type uni:Universities
			}
				YES	AstonUniversity
					CoventryUniversity
					UniversityofBirmingham

4	Uni Budget Fee	The course fees listed from the students chosen budget	SELECT ?y ?price where {
			?y uni:postgradPriceAre ?price .
			?y rdf:type uni:Universities
			FILTER (?price <15000)
			}
				YES	AstonUniversity
					CoventryUniversity
					UniversityofBirmingham

5	Student Satisfaction Rate, Professor Rating	List of high SSR and PR from the students chosen score from 1-5	SELECT ?y ?PR where {
			?y uni:ProfRating ?PR .
			?y rdf:type uni:Universities
			}
				YES	Student wants the PR Ranked University.

6	Chosen Scholarships	Academic Excellence	SELECT ?x WHERE { ?x rdfs:subClassOf uni:Scholarships FILTER regex(str(?x) , "AcademicExcellence")}	YES	Student is able to obtain this scholarship.
7	Best possible University for the Student?	After running each query eliminating Universities that don't meet the criteria for the student after all the above circumstances Evaluated, the last possible Uni or Universities remaining will be the best destination for the student.	Once the queries are run the Universities that can't apply to the student will be eliminated and the one remaining will be the best Possible choice for the student.	N/A	UniversityofBirmingham This student's best destination from the ontology suggests UniversityofBirmingham the options include Coventry and Aston too however UniversityofBirmingham has a higher PR score of 3.78

Overall Summary of Accuracy

Student	Pool of University	University Destination	Type of Study
A	49-50	Coventry University	Undergraduate BSc
B	15-25	University of Birmingham	Undergraduate BSc
C	11-20	University of Warwick	Undergraduate BSc
D	35-45	Aston University	Undergraduate BSc
E	1-10	Cambridge University	Postgraduate MSc
F	15-25	University of Birmingham	Postgraduate MSc
G	35-45	Aston University	Postgraduate MSc
H	N/A	Non-Eligible	Postgraduate MSc
I	49-50	Coventry University	Postgraduate MSc
J	N/A	Non-Eligible	Postgraduate MSc
K	15-25	University of Birmingham	Postgraduate MSc

This type of evaluation helped evaluate and test the ontology. Eleven students looking to develop their careers chose to participate in this project. They were given feedback depending on their answers to the Questionnaires. The participants had different scenarios that led to their eventual university Destination. Some had the best results possible however they couldn't afford the financial package regardless of whether they chose to take a loan out. Some got what they wanted, the cheapest and best option, and some were left unhappy because they were not eligible for any University. A range of SPARQL queries was tested such as Filtering Subjects, more than, less than, ascending order, calculating accommodation costs by each University by a specific price, calculating the average Professor rating and Student satisfaction rates and the sum of each University Undergrad/Postgrad financial package. Each student had different criteria's such as budget, grades, and requirements. After each query was tested, the number of eligible universities was noted, and after the following query, any University that wasn't eligible was removed. Some students had their University destination sorted out after a few queries, and some were concluded till the end.

Domain Coverage

This type of evaluation allows the ontology to be implemented further with the help of feedback from participants from this project who gave their feedback in another survey that took place using Google Forms. A demo was sent out to each of the participants who agreed to take part with the whole Student prospectus Ontology explained and a demonstration of SPARQL queries which were used depending on a student's response. The questions will be analysed as well as the answers to these questions.

1. Do you understand the Student Prospectus Ontology?

The feedback for this question was 100% yes. This response is excellent, which means the participants understood what was happening during the demo and why this ontology was implemented. (Appendix M, Fig 1).

2. Do you believe the Ontology could help you make the right University Choice?

The feedback for this question was also very positive. However, one participant also added, "I believe it can help make the right choice if coupled with a GUI for user-friendliness". This does seem true. However, when the SPARQL Queries are run, they can only be run one at a time. However, as seen in Appendix B-k, the responses are evident and precise. Another solution to tackle this problem could be to add up all the answers from a user in one GUI format. (Appendix M, Fig 2).

3. If I were to FILTER BY ?xcourses offered or ?YFacilities would that be sufficient for you?

This question was posed based on the Accuracy evaluation previously where those methods were used. Six participants agreed with the question posed, two disagreed, and another mentioned the filtering of languages offered. 'languages offered' was added from this feedback, and more filters such as Course Req. The responses are mainly positive and show that the participants were mainly applied with the Filters used. (Appendix M, Fig 3).

4. What other filters or complex queries would you test to the Ontology to help choose the right University.

With this question I wanted the participant's point of view and where I could test the Student prospectus ontology. Many suggestions were given; some were related to what could be added to test the ontology, and some were unreasonable since it doesn't make sense in this category. One that stood out was "Availability of Scholarships". I have tested the ontology with this query and have added a subsection of Scholarships. (Appendix M, Fig 4)

5. What alterations would you make to the Ontology?

The previous question focused on what queries I could test the ontology with. The purpose of this question is to ask the participants to give any other alterations that could be made to the ontology. The most common response is: To add more Universities to the ontology and add more courses. One different answer than the other participants was "Coupling it with a GUI for ranking the results of each query". As mentioned, previously it isn't possible to input more than one query in the ontology; therefore, an example of this is made 'Appendix M, Fig 2'. However, ranking the results of each query is done similarly in the Accuracy evaluating section where the expected vs actual results tables were created. The aftermath resulted in a Table with each of the student's results from the tests. To add from the feedback previously, the change was implemented and is shown in Appendix M, Fig 5, where seven new universities were added and six new courses.

6. Would you recommend this Student Prospectus Ontology to another Student?

This question was the final question in the questionnaire. The response was very welcoming as every participant added that they would recommend the Student prospectus ontology to another student. Overall, the feedback was very positive, and any changes that were suggested were implemented and changes that couldn't be made. An explanation was given as to why. Using Domain coverage allowed me to ask the participants what they think about the Ontology and what changes they would make and what queries they would add. The feedback was positive, and changes were made to the student prospectus ontology. The Accuracy type of evaluation allowed me to test the Ontology and give possible destination points to Students. This evaluation allowed me to evaluate the ontology, make changes, and have a better product. Appendix M, Fig 6.

Domain Coverage allowed the student prospectus ontology to be evaluated; it bought a different perspective of any ideas which could be bought forward and allowed some changes that could take place to ensure the ontology could be implemented the best way possible. The changes were positive ones; adding more universities allowed a broader search and better-quality data to be presented, and more courses allowed students to choose different courses, which provides flexibility. More sections were added to the class hierarchy, such as 'Scholarships' which benefit students who meet these criteria. Another critical aspect that could be included for master students could be bursaries, which would reduce payment for students who undertook a Bsc course previously or those struggling financially.

6. Conclusion

At the start of the project, the project aimed to build a student prospectus to help students make the right choice when choosing their University destination. After discussing the benefits of the semantic web, it was essential to build a successful web ontology model for a student prospectus. The class hierarchy built a solid foundation, identifying key relationships. This process helped the rest of the project to go smoothly. Due to time constraints, it was important when choosing which Universities would apply in this model, so after looking upon the ranked Universities, I decided to select Universities from a pool of 100. In total, 5 Universities were selected due to a lack of time. However, as shown in the Discussion of results, the Ontology had 12 Universities. The reason the Universities were chosen from each 1-10 pool was that when a University was chosen, for example, 'The University of Oxford', this University would be associated in the top 10, so it would be pointless adding all the universities from that pool since they would be similar, thus granting more accuracy and quality results. In terms of the courses offered by the universities, all are very similar, and in total there could be up to 100-200 courses in similar fields such as Science could be split into, Medicine, engineering, dentistry, orthodontics etc. To be precise, a total of 18 courses were included as Individuals as courses offered in the Ontology.

For accurate results, it was necessary to test the Ontology, and there was no better way of this being done than having the testing done via Student responses and feedback. Easy to complete without assistance. It is generally suggested that self-completion questionnaires be shorter than those administered during interviews and contain mostly closed-ended questions (Bouraque and Fielder, 1995). A total of 11 participants agreed to be anonymised in this project and gave their responses to the questions in the questionnaire with their requirements. This questionnaire wasn't a feedback type of questionnaire. It was to get data from the students to input queries into the Ontology using Sparql to get potential results for each student, such as which pool of universities they qualify for and which specific University from this student prospectus ontology. The last student was evaluated after the feedback given and changes where implemented. Questionnaires are a cost-efficient way to collect a quick sum of information from a big group of people in a short amount of time, which can grant immediate results and be able to use for easy analysis and visualisation. (Debois, S 2019). This was the exact reason to obtain information from students looking to secure a University in the upcoming academic year. The results from the Student questionnaires are shown in the Discussion of Results.

For the second part of the evaluation, another questionnaire took place using This questionnaire allowed the participants to critically analyse the student prospectus ontology and give feedback according to the questions. These participants were a different group of people who agreed to participate in this project and be anonymised. A demo of the whole student prospectus ontology explaining the 4 phases was sent out to the participants. The demo also included a test of a student questionnaire done previously in Accuracy. Overall, as mentioned in the discussion of results, the feedback was very positive, and the changes that were suggested that were applicable were made. Seven more Universities were added, and seven new courses were added to the ontology to obtain data from a more extensive field. One unique feedback that was given to "Coupling it with a GUI for ranking the results of each query" this was a task that wasn't applicable; however, the student's results were ranked and noted in the Overall summary of Accuracy and Appendix M, Fig 2 where one of the student's results was added to one image where it is possible to see all the results because it was impossible to query more than one query at a time.

Overall, the Student prospectus ontology was both tested and evaluate for the purpose of eliminating errors in the model and making changes were necessary. The feedback obtained was very over whelming and it provided fresh ideas to implement. Such as one of the participants suggested 'Availability of Scholarships' From this feedback Scholarships was added to the class hierarchy of the ontology and the types of scholarships were added and filtered to see which ones were available. The ontology model was built successfully, the UI of the model can be seen on the Student prospectus ontology Ontograph. The SPARQL queries were tested and there was no issue with the reasoner as everything worked. From the questionnaires that were filled in by students each and everyone of them said that they weren't going to live at home, this meant they were prepared to pay accommodation fees which was queried for students. Some who had a low budget but a great UCAS/IELTS score managed to secure a place but a lower ranked university, however if these students were to re assess their choice they could possibly live from home and go to that specific university if its viable option for them. I believe if I had more time more universities would be added, and more options would be accessible in the class hierarchy for students.

The project evaluation process consists of collecting, recording, and organizing information about project results and lessons learned. The project evaluation process consists of collecting, recording, and organizing information about project results and lessons learned. (Deren, K 2020). For the purpose of this project this model shows that the semantic web model approach can be used successfully as demonstrated in this project. However as said previously if for example 200 universities were added and a complete number of courses such as 400 and more options such as facilities and languages and extra resources would give a better-quality approach. As mentioned in the literature review if there was more time then along with more universities, the university open days would be included.

To be critical the student prospectus ontology lacks information regarding University bursaries and open days. But the main point of the ontology was to see whether it would be successful and whether it would work. To be ale to add more Universities, courses offered, bursaries information and University open days would make the Student ontology more complete. Comparing other Prospectuses and other ontologies helped with the project, to analyse the product, gather ideas and not repeat mistakes.

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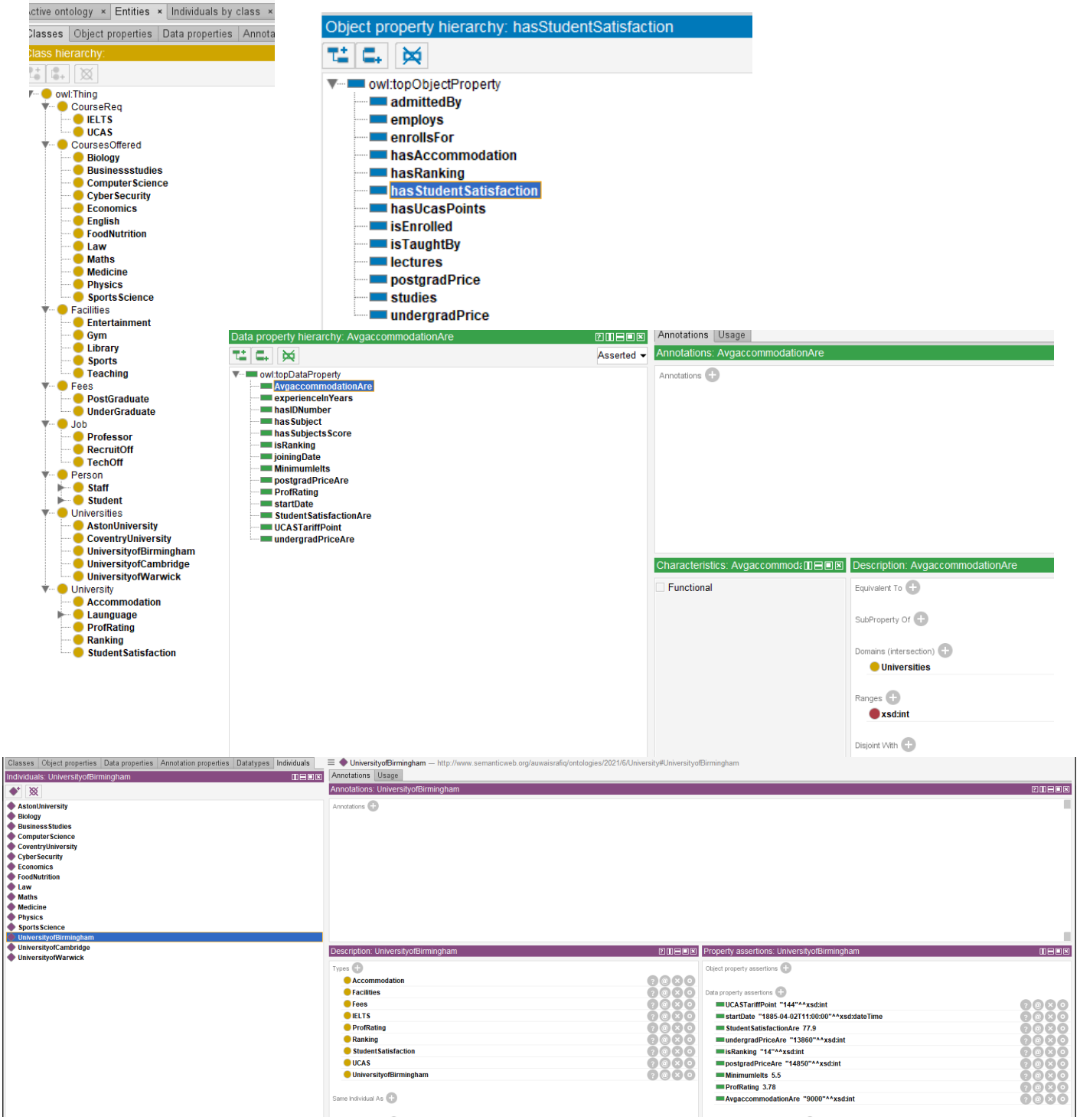
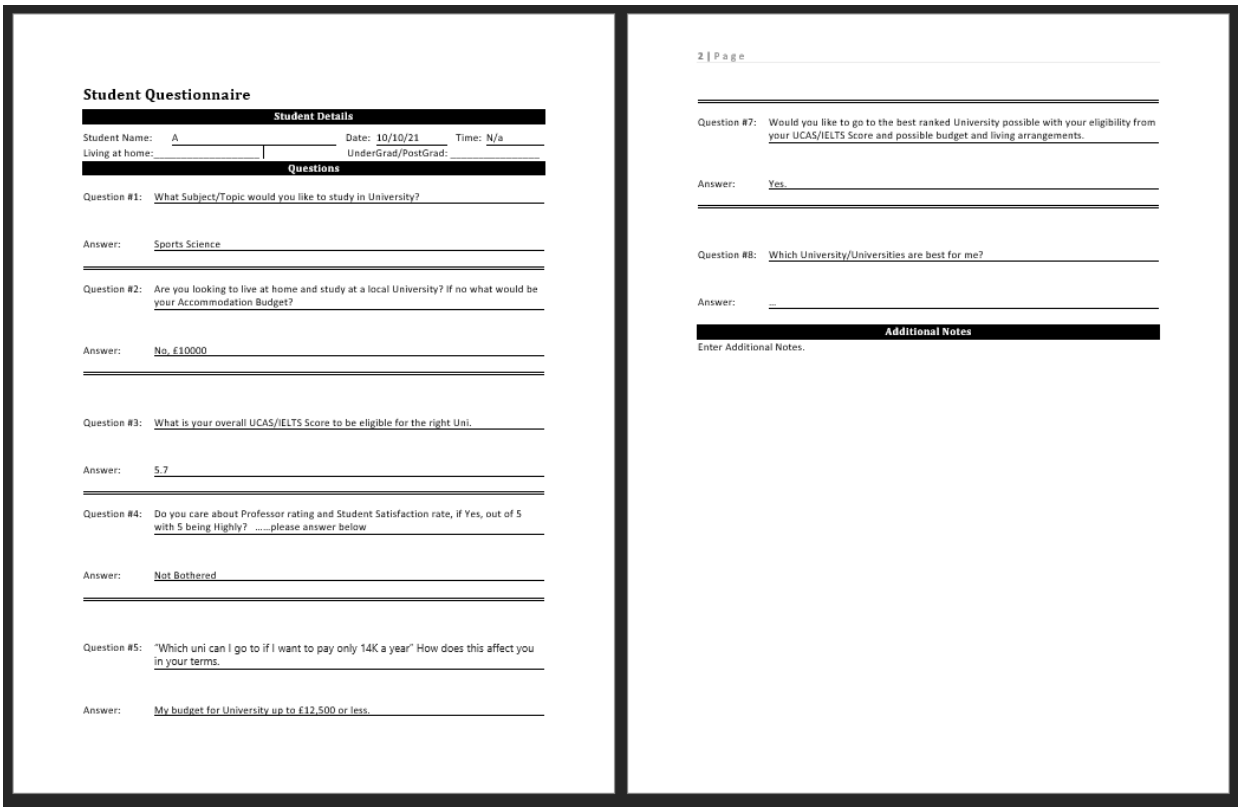
Appendix

Appendix A, Fig 1: Student Prospectus Ontology



Appendix A, Fig 2: Student Questionnaire



Student Questionnaire

Student Details

Student Name: A Date: 10/10/21 Time: N/a

Living at home: UnderGrad/PostGrad:

Questions

Question #1: What Subject/Topic would you like to study in University?

Answer: Sports Science

Question #2: Are you looking to live at home and study at a local University? If no what would be your Accommodation Budget?

Answer: No, £10000

Question #3: What is your overall UCAS/IELTS Score to be eligible for the right Uni.

Answer: 5.7

Question #4: Do you care about Professor rating and Student Satisfaction rate, if Yes, out of 5 with 5 being Highly? .....please answer below

Answer: Not Bothered

Question #5: "Which uni can I go to if I want to pay only 14K a year" How does this affect you in your terms.

Answer: My budget for University up to £12,500 or less.

2 | Page

Question #7: Would you like to go to the best ranked University possible with your eligibility from your UCAS/IELTS Score and possible budget and living arrangements.

Answer: Yes.

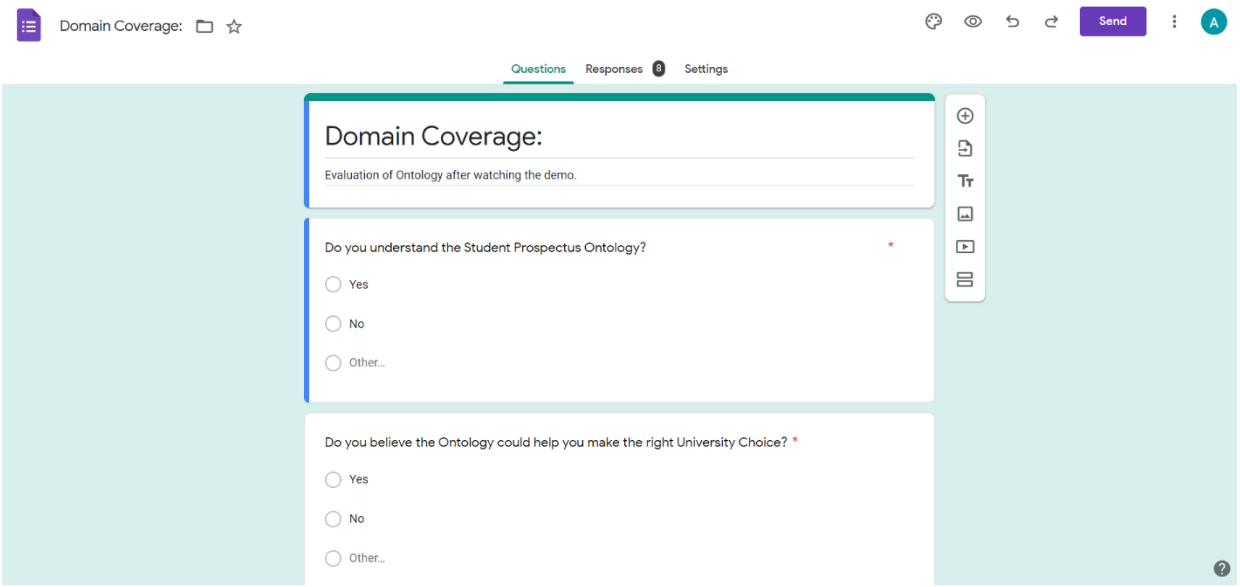
Question #8: Which University/Universities are best for me?

Answer: _

Additional Notes

Enter Additional Notes.

Appendix A, Fig 3: Google Form



https://docs.google.com/forms/d/e/1FAIpQLSeZTL1CaCFppuFFvD9kfL5rkzXn8ozDq10uSreXPTITLWr1YQ/viewform?usp=sf_link

Appendix B, Fig 1

Snap SPARQL Query:

```
PREFIX uni: <http://www.semanticweb.org/auwaisrafiq/ontologies/2021/6/University#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>


SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered
FILTER regex(str(?x) , "SportsScience") }
```

Execute

?x
uni:SportsScience

Appendix B, Fig 2

```
SELECT ?y ?Accommodation where {
?y uni:AvgaccommodationAre ?Accommodation .
?y rdf:type uni:Universities
FILTER (?Accommodation <10000).
}
```

Execute

?y	?Accommodation
uni:UniversityofWarwick	9580
uni:AstonUniversity	6000
uni:CoventryUniversity	7500
uni:UniversityofBirmingham	9000

Appendix B, Fig 3

```
SELECT ?y ?IELTS where {
?y uni:MinimumIelts ?IELTS .
?y rdf:type uni:Universities
}
```

Execute

?y	?IELTS
uni:UniversityofCambridge	6.5
uni:UniversityofWarwick	5.5
uni:AstonUniversity	5.5
uni:CoventryUniversity	4.5
uni:UniversityofBirmingham	5.5

Appendix B, Fig 4

```
SELECT ?y ?price where {
?y uni:undergradPriceAre ?price .
?y rdf:type uni:Universities
FILTER (?price <12500)
}
```

Execute

?y	?price
uni:CoventryUniversity	10766

Appendix C, Fig 1

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered
FILTER regex(str(?x) , "Biology") }
```

Execute

?x
uni:Biology

Appendix C, Fig 2

```
SELECT ?y ?Accommodation where {
?y uni:AvgaccommodationAre ?Accommodation .
?y rdf:type uni:Universities
FILTER (?Accommodation <13000).
}
```

Execute

?y	?Accommodation
uni:UniversityofCambridge	12000
uni:UniversityofWarwick	9580
uni:AstonUniversity	6000
uni:CoventryUniversity	7500
uni:UniversityofBirmingham	9000

Appendix C, Fig 3

```
SELECT ?y ?IELTS where {
?y uni:MinimumIelts ?IELTS .
?y rdf:type uni:Universities
}
```

Execute

?y	?IELTS
uni:UniversityofCambridge	6.5
uni:UniversityofWarwick	5.5
uni:AstonUniversity	5.5
uni:CoventryUniversity	4.5
uni:UniversityofBirmingham	5.5

Appendix C, Fig 4

```
SELECT ?y ?price where {
?y uni:undergradPriceAre ?price .
?y rdf:type uni:Universities
FILTER (?price <14000)
}
```

Execute

?y	?price
uni:AstonUniversity	13500
uni:CoventryUniversity	10766
uni:UniversityofBirmingham	13860

Appendix C, Fig 5

```
SELECT ?y ?pr where {
?y uni:ProfRating ?pr .
?y rdf:type uni:Universities
}
```

Execute

?y	?pr
uni:UniversityofCambridge	4.2
uni:UniversityofWarwick	3.74
uni:AstonUniversity	3.6
uni:CoventryUniversity	3.51
uni:UniversityofBirmingham	3.78

Appendix D, Fig 1

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered
FILTER regex(str(?x) , "Maths") }
```

Execute

?x
uni:Maths

Appendix D, Fig 2

```
SELECT ?y ?Accommodation where {
?y uni:AvgaccommodationAre ?Accommodation .
?y rdf:type uni:Universities
FILTER (?Accommodation <10000).
}
```

Execute

?y	?Accommodation
uni:UniversityofWarwick	9580
uni:AstonUniversity	6000
uni:CoventryUniversity	7500
uni:UniversityofBirmingham	9000

Appendix D, Fig 3

```
SELECT ?y ?Ucas where { ?y uni:UCASTariffPoint ?Ucas . ?y rdf:type uni:Universities }
```

Execute

?y	
uni:UniversityofCambridge	160
uni:UniversityofWarwick	152
uni:AstonUniversity	136
uni:CoventryUniversity	136
uni:UniversityofBirmingham	144

Appendix D, Fig 4

```
SELECT ?y ?price where {
?y uni:undergradPriceAre ?price .
?y rdf:type uni:Universities
FILTER (?price <16000)
}
```

Execute

?y	
uni:UniversityofWarwick	15820
uni:AstonUniversity	13500
uni:CoventryUniversity	10766
uni:UniversityofBirmingham	13860

Appendix D, Fig 5

```
SELECT ?y ?SSR where { ?y uni:StudentSatisfactionAre ?SSR . ?y rdf:type uni:Universities }
```

Execute

?y	?SSR
uni:UniversityofCambridge	85.5
uni:UniversityofWarwick	79.2
uni:AstonUniversity	77.3
uni:CoventryUniversity	81.5
uni:UniversityofBirmingham	77.9

Appendix E, Fig 1

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Law") }
```

Execute

?x
uni:Law

Appendix E, Fig 2

```
SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <7000). }
```

Execute

?y	?Accommodation
uni:AstonUniversity	6000

Appendix E, Fig 3

```
SELECT ?y ?Ucas where { ?y uni:UCASTariffPoint ?Ucas . ?y rdf:type uni:Universities }
```

Execute

?y	?Ucas
uni:UniversityofCambridge	160
uni:UniversityofWarwick	152
uni:AstonUniversity	136
uni:CoventryUniversity	136
uni:UniversityofBirmingham	144

Appendix E, Fig 4

```
SELECT ?y ?price where { ?y uni:undergradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <14000) }
```

Execute

?y	?price
uni:AstonUniversity	13500
uni:CoventryUniversity	10766
uni:UniversityofBirmingham	13860

Appendix F, Fig 1

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "ComputerScience") }
```

Execute

?x
uni:ComputerScience

Appendix F, Fig 2

```
SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <12500). }
```

Execute

?y	?Accommodation
uni:UniversityofCambridge	12000
uni:UniversityofWarwick	9580
uni:AstonUniversity	6000
uni:CoventryUniversity	7500
uni:UniversityofBirmingham	9000

Appendix F, Fig 3

```
SELECT ?y ?Ucas where { ?y uni:UCASTariffPoint ?Ucas . ?y rdf:type uni:Universities }
```

Execute

?y	?Ucas
uni:UniversityofCambridge	160
uni:UniversityofWarwick	152
uni:AstonUniversity	136
uni:CoventryUniversity	136
uni:UniversityofBirmingham	144

Appendix F, Fig 4

```
SELECT ?y ?price where { ?y uni:postgradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <24000) }
```

Execute

?y	?price
uni:UniversityofCambridge	23187
uni:AstonUniversity	13500
uni:CoventryUniversity	10689
uni:UniversityofBirmingham	14850

Appendix F, Fig 5

```
SELECT ?y ?SSR where { ?y uni:StudentSatisfactionAre ?SSR . ?y rdf:type uni:Universities }
```

Execute

?y	?SSR
uni:UniversityofCambridge	85.5
uni:UniversityofWarwick	79.2
uni:AstonUniversity	77.3
uni:CoventryUniversity	81.5
uni:UniversityofBirmingham	77.9

```
SELECT ?y ?PR where { ?y uni:ProfRating ?PR . ?y rdf:type uni:Universities }
```

Execute

?y	?PR
uni:UniversityofCambridge	4.2
uni:UniversityofWarwick	3.74
uni:AstonUniversity	3.6
uni:CoventryUniversity	3.51
uni:UniversityofBirmingham	3.78

Appendix G, Fig 1

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Medicine") }
```

Execute

?x
uni:Medicine

Appendix G, Fig 2

```
SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <12500). }
```

Execute

?y	?Accommodation
uni:UniversityofCambridge	12000
uni:UniversityofWarwick	9580
uni:AstonUniversity	6000
uni:CoventryUniversity	7500
uni:UniversityofBirmingham	9000

Appendix G, Fig 3

```
SELECT ?y ?Ucas where { ?y uni:UCASTariffPoint ?Ucas . ?y rdf:type uni:Universities }
```

Execute

?y	?Ucas
uni:UniversityofCambridge	160
uni:UniversityofWarwick	152
uni:AstonUniversity	136
uni:CoventryUniversity	136
uni:UniversityofBirmingham	144

Appendix G, Fig 4

```
SELECT ?y ?price where { ?y uni:postgradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <15000) }
```

Execute

?y	?price
uni:AstonUniversity	13500
uni:CoventryUniversity	10689
uni:UniversityofBirmingham	14850

Appendix G, Fig 5

```
SELECT ?y ?PR where { ?y uni:ProfRating ?PR . ?y rdf:type uni:Universities }
```

Execute

?y	?PR
uni:UniversityofCambridge	4.2
uni:UniversityofWarwick	3.74
uni:AstonUniversity	3.6
uni:CoventryUniversity	3.51
uni:UniversityofBirmingham	3.78

Appendix H, Fig 1

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Medicine") }
```

Execute

?x
uni:Medicine

Appendix H, Fig 2

```
SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <9500). }
```

Execute

?y	?Accommodation
uni:AstonUniversity	6000
uni:CoventryUniversity	7500
uni:UniversityofBirmingham	9000

Appendix H, Fig 3

```
SELECT ?y ?Ucas where { ?y uni:UCASTariffPoint ?Ucas . ?y rdf:type uni:Universities }
```

Execute

?y	?Ucas
uni:UniversityofCambridge	160
uni:UniversityofWarwick	152
uni:AstonUniversity	136
uni:CoventryUniversity	136
uni:UniversityofBirmingham	144

Appendix H, Fig 4

```
SELECT ?y ?price where { ?y uni:postgradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <13800) }
```

Execute

?y	?price
uni:AstonUniversity	13500
uni:CoventryUniversity	10689

Appendix H, Fig 5

```
SELECT ?y ?PR where { ?y uni:ProfRating ?PR . ?y rdf:type uni:Universities }
```

Execute

?y	?PR
uni:UniversityofCambridge	4.2
uni:UniversityofWarwick	3.74
uni:AstonUniversity	3.6
uni:CoventryUniversity	3.51
uni:UniversityofBirmingham	3.78

Appendix I, Fig 1

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Law") }
```

Execute

?x
uni:Law

Appendix I, Fig 2

```
SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <10000). }
```

Execute

?y	?Accommodation
uni:UniversityofWarwick	9580
uni:AstonUniversity	6000
uni:CoventryUniversity	7500
uni:UniversityofBirmingham	9000

Appendix I, Fig 3

```
SELECT ?y ?IELTS where { ?y uni:MinimumIelts ?IELTS . ?y rdf:type uni:Universities }
```

Execute

?y	?IELTS
uni:UniversityofCambridge	6.5
uni:UniversityofWarwick	5.5
uni:AstonUniversity	5.5
uni:CoventryUniversity	4.5
uni:UniversityofBirmingham	5.5

Appendix I, Fig 4

```
SELECT ?y ?price where { ?y uni:postgradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <17000) }
```

Execute

?y	?price
uni:AstonUniversity	13500
uni:CoventryUniversity	10689
uni:UniversityofBirmingham	14850

Appendix J, Fig 1

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "Maths") }
```

Execute

?x
uni:Maths

Appendix J, Fig 2

```
SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <7850). }
```

Execute

?y	?Accommodation
uni:AstonUniversity	6000
uni:CoventryUniversity	7500

Appendix J, Fig 3

```
SELECT ?y ?IELTS where { ?y uni:MinimumIelts ?IELTS . ?y rdf:type uni:Universities }
```

Execute

?y	?IELTS
uni:UniversityofCambridge	6.5
uni:UniversityofWarwick	5.5
uni:AstonUniversity	5.5
uni:CoventryUniversity	4.5
uni:UniversityofBirmingham	5.5

Appendix J, Fig 4

```
SELECT ?y ?price where { ?y uni:postgradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <11000) }
```

Execute

?y	?price
uni:CoventryUniversity	10689

Appendix K, Fig 1

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered FILTER regex(str(?x) , "SportsScience") }
```

Execute

?x
uni:SportsScience

Appendix K, Fig 2

```
SELECT ?y ?Accommodation where { ?y uni:AvgaccommodationAre ?Accommodation . ?y rdf:type uni:Universities FILTER (?Accommodation <20000). }
```

Execute

?y	?Accommodation
uni:UniversityofCambridge	12000
uni:UniversityofWarwick	9580
uni:AstonUniversity	6000
uni:CoventryUniversity	7500
uni:UniversityofBirmingham	9000

Appendix K, Fig 3

```
SELECT ?y ?Ucas where { ?y uni:UCASTariffPoint ?Ucas . ?y rdf:type uni:Universities }
```

Execute

?y	?Ucas
uni:UniversityofCambridge	160
uni:UniversityofWarwick	152
uni:AstonUniversity	136
uni:CoventryUniversity	136
uni:UniversityofBirmingham	144

Appendix K, Fig 4

```
SELECT ?y ?price where { ?y uni:postgradPriceAre ?price . ?y rdf:type uni:Universities FILTER (?price <30000) }
```

Execute

?y	?price
uni:UniversityofCambridge	23187
uni:UniversityofWarwick	24500
uni:AstonUniversity	13500
uni:CoventryUniversity	10689
uni:UniversityofBirmingham	14850

Appendix K, Fig 5

```
SELECT ?y ?PR where { ?y uni:ProfRating ?PR . ?y rdf:type uni:Universities }
```

Execute

?y	?PR
uni:UniversityofCambridge	4.2
uni:UniversityofWarwick	3.74
uni:AstonUniversity	3.6
uni:CoventryUniversity	3.51
uni:UniversityofBirmingham	3.78

Appendix L, Fig 1

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered
FILTER regex(str(?x) , "Maths") }
```

Execute

?x
uni:Maths

Appendix L, Fig 2

```
SELECT ?y ?Accommodation where {
?y uni:AvgaccommodationAre ?Accommodation .
?y rdf:type uni:Universities
FILTER (?Accommodation <13000).
}
```

Execute

?y	?Accommodation
uni:UniversityofCambridge	12000
uni:UniversityofWarwick	9580
uni:AstonUniversity	6000
uni:CoventryUniversity	7500
uni:UniversityofBirmingham	9000

Appendix L, Fig 3

```
SELECT ?y ?Ucas where { ?y uni:UCASTariffPoint ?Ucas . ?y rdf:type uni:Universities }
```

Execute

?y	?Ucas
uni:UniversityofCambridge	160
uni:UniversityofWarwick	152
uni:AstonUniversity	136
uni:CoventryUniversity	136
uni:UniversityofBirmingham	144

Appendix L, Fig 4

```
SELECT ?y ?price where {
?y uni:postgradPriceAre ?price .
?y rdf:type uni:Universities
FILTER (?price <15000)
}
```

Execute

?y	?price
uni:AstonUniversity	13500
uni:CoventryUniversity	10689
uni:UniversityofBirmingham	14850

Appendix L, Fig 5

```
SELECT ?y ?PR where { ?y uni:ProfRating ?PR . ?y rdf:type uni:Universities }
```

Execute

?y	?PR
uni:UniversityofCambridge	4.2
uni:UniversityofWarwick	3.74
uni:AstonUniversity	3.6
uni:CoventryUniversity	3.51
uni:UniversityofBirmingham	3.78

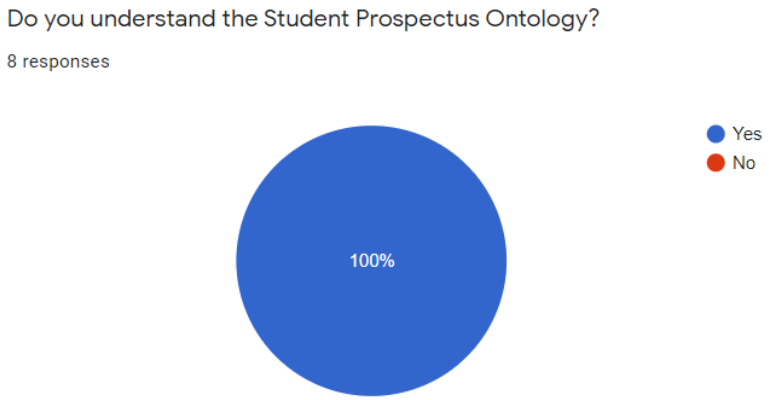
Appendix L, Fig 6

```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:Scholarships
FILTER regex(str(?x) , "AcademicExcellence") }
```

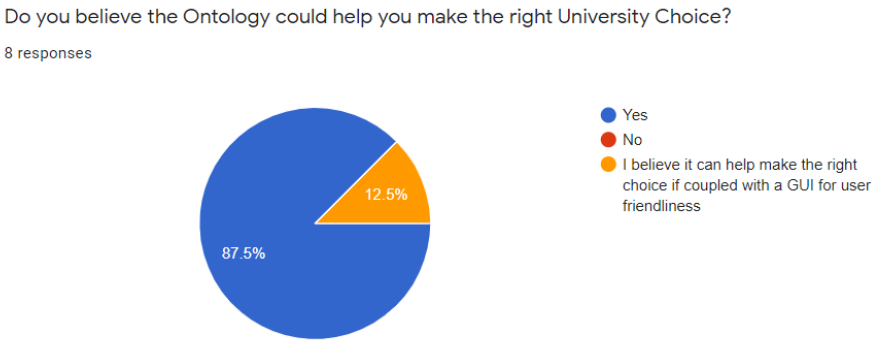
Execute

?x
uni:AcademicExcellence

Appendix M, Fig 1



Appendix M, Fig 2



Snap SPARQL Query:

```
PREFIX uni: <http://www.semanticweb.org/auwaisrafiq/ontologies/2021/6/University#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

SELECT ?x WHERE { ?x rdfs:subClassOf uni:CoursesOffered
FILTER regex(str(?x) , "SportsScience") }
```

Execute

uni:SportsScience

```
SELECT ?y ?Accommodation where {
?y uni:AvgaccommodationAre ?Accommodation .
?y rdf:type uni:Universities
FILTER (?Accommodation <10000).
}
```

Execute

?y	?Accommodation
uni:UniversityofWarwick	9580
uni:AstonUniversity	6000
uni:CoventryUniversity	7500
uni:UniversityofBirmingham	9000

```
SELECT ?y ?IELTS where {
?y uni:MinimumIelts ?IELTS .
?y rdf:type uni:Universities
}
```

Execute

?y	?IELTS
uni:UniversityofCambridge	6.5
uni:UniversityofWarwick	5.5
uni:AstonUniversity	5.5
uni:CoventryUniversity	4.5
uni:UniversityofBirmingham	5.5

```
SELECT ?y ?price where {
?y uni:undergradPriceAre ?price .
?y rdf:type uni:Universities
FILTER (?price <12500)
}
```

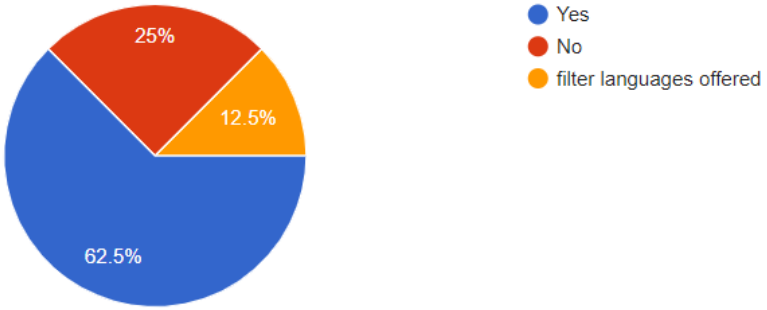
Execute

?y	?price
uni:CoventryUniversity	10766

Appendix M, Fig 3

If I were to FILTER BY ?xcourses offered or ?YFacilities would that be sufficient for you?

8 responses




```
SELECT ?x WHERE { ?x rdfs:subClassOf uni:LanguagesOffered
FILTER regex(str(?x) , "Urdu") }
```

Execute

?x
uni:Urdu

Appendix M, Fig 4

What other filters or complex queries would you test to the Ontology to help choose the right University.

8 responses

- query calculating and minimum average cost of accommodation and university fees
- Query to test the cost of extra educational resources and Facilites
- Query to calculate the highest Uni ranking.
- Query to calculate the best Prof Rating
- A Query to test the cost of extra educational resources and Facilites
- Query calculating best Uni ranking and Professor rating
- Availability of Scholarships
- Filters to check the distance between Each University

```
SELECT ?x WHERE {
  ?x rdfs:subClassOf uni:Scholarships
}
```

Execute

?x
uni:EmployerScholarships
uni:SportsScholarships
owl:Nothing
uni:AthleticScholarships
uni:Scholarships
uni:AcademicExcellence

6 results

Appendix M, Fig 5

What alterations would you make to the Ontology?

8 responses

more universities, subjects offered and entertainment facilities

More subjects and Universities to get better results and more options for the student

more universities will allow better quality of testing

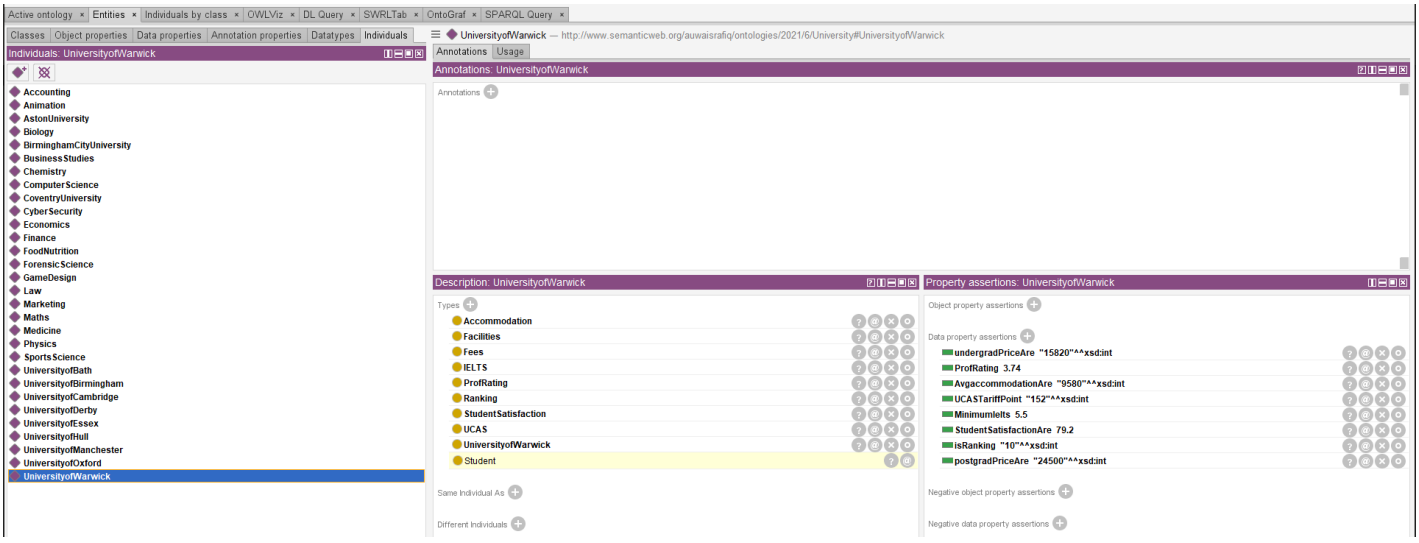
More Universities, Courses

A possible alteration could be More subjects and Universities to get better results and more options for the student

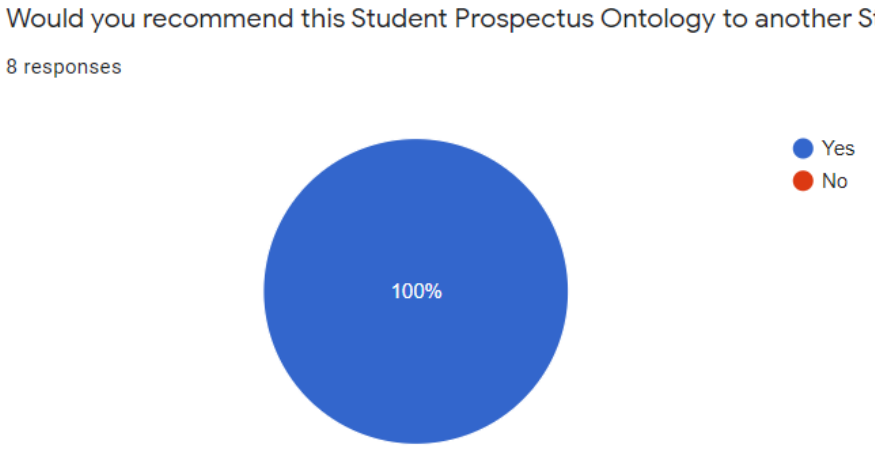
More Universities

Coupling it with a GUI for ranking the results of each query

Q 5: More Universities would help give a better quality University matching a students criteria



Appendix M, Fig 6



Appendix N, Fig 1