

**Y Pwyllgor Menter a Busnes**  
**The Enterprise and Business Committee**  
**[Trawsgrifiad o we-sgwrs]**  
**[Transcript of web-chat]**

**Dydd Iau, 30 Ebrill 2014**  
**Thursday, 30 April 2014**

**Aelodau'r pwyllgor yn bresennol**  
**Committee members in attendance**

Mick Antoniaw	Llafur Labour
Yr Arglwydd/Lord Elis-Thomas	Plaid Cymru The Party of Wales
William Graham	Ceidwadwyr Cymreig (Cadeirydd y Pwyllgor) Welsh Conservatives (Committee Chair)
Eluned Parrott	Democratiaid Rhyddfrydol Cymru Welsh Liberal Democrats

**Ymchwiliad Dilynol i Sgiliau Gwyddoniaeth, Technoleg, Peirianeg a  
 Mathemateg (STEM)**  
**Follow-up Inquiry into Science, Technology, Engineering and Mathematics  
 (STEM) Skills**

**Trawsgrifiad o We-sgwrs gyda Myfyrwyr Sefydliadau Addysg Uwch a Phellach  
 a Phrentisiaid**  
**Transcript of Web-chat with Further and Higher Education Institution students  
 and apprentices**

**Y Pwyllgor Menter a Busnes:** Bore da, bawb. Dim ond neges sydyn i ddweud y bydd y sgwrs yn cychwyn am 10.15. Mae croeso i chi ymateb i'r cwestiynau yn Gymraeg neu Saesneg. Bydd William Graham AC (Cadeirydd y Pwyllgor) Mick Antoniaw AC, Dafydd Elis-Thomas AC a Eluned Parrott AC yn cymryd rhan yn y we-sgwrs. Bydd y gwe-sgwrs yn dechrau yn awr.

**The Enterprise and Business Committee:** Good morning, everyone. Just a quick message to confirm that the discussion will start at 10.15. You are welcome to respond to questions in Welsh or English. William Graham AM (Chair of the Committee), Mick Antoniaw AM, Eluned Parrott AM and Dafydd Elis-Thomas AM will be taking part in the web-chat. The web chat will start now.

Beth wnaeth eich ysgogi i wneud eich cwrs?

What inspired you to choose your course?

**Benjamin Williams:** I chose it because engineering is becoming more important these days and there is a shortage of jobs in engineering.

**Aled Illtud:** Yn bennaf, y syniad bod y llais Cymraeg o safbwynt pynciau STEM ddim yn cael ei glywed yn ddigon aml ar y cyfan. Hefyd y syniad o allu cael y cyfle o wella'r

**Aled Illtud:** Mainly, the idea that Welsh voices are not heard often enough on STEM subjects, generally. Also, the idea of improving the subject that I am studying for

pwnc rydw i'n ei astudio i bobl eraill.

others.

**Y Pwyllgor Menter a Busnes:** Aled, a ydych chi wedi penderfynu eich bod am ddysgu'r pwnc yn barod? A yw'r ffaith eich bod wedi dewis astudio drwy gyfrwng y Gymraeg wedi rhwystro eich opsiynau mewn unrhyw ffordd?

**The Enterprise and Business Committee:** Have you decided that you want to teach the subject already? Has your decision to choose to study through the medium of Welsh limited your options in any way?

**Aled Illtud:** Mae dewis fy mhwnic yn y Gymraeg wedi bod yn mantais i mi yn bennaf oherwydd mae gan fy nhwtor personol fwy o amser i siarad gyda ni, y myfyrwyr Cymraeg, yn benodol. Rwy'n ystyried y syniad o ddysgu ar hyn o bryd, ydw.

**Aled Illtud:** Choosing to study my subject in Welsh has been an advantage for me mainly because my personal tutor has more time to talk to students studying in Welsh specifically. Yes, I am currently considering the idea of teaching.

**Ryan Myles-Roberts:** I was originally going to choose physics, but I preferred the less applied and more pure aspect of maths with the rigour that comes with it. I also liked the idea that maths does not really limit my options for future careers as a result of the wide range of skills.

**The Enterprise and Business Committee:** Ben, do you mean that there is a shortage of jobs in engineering or a shortage of apprentices choosing to do engineering?

**Benjamin Williams:** I meant a shortage in apprentices choosing engineering because I was reading about the shortfall of engineers in Britain as the industry is growing again, I think.

**Chris Lorch:** For me, during year 9 of secondary school we did a bit more in-depth studying of space science and it really just blew my mind. I have always had an interest in all sciences but space science was what really appealed to me.

While we did not hear too much about STEM in year 10 and 11 at my secondary school, those doing A-levels in a STEM subject did have continuous encouragement to follow such a career path, but I felt it was more directed at people who already knew what they wanted rather than at year 11 students who did not have as much of an idea about their future careers.

**The Enterprise and Business Committee:** Out of 10, how would you rate the importance of job prospects to your decision to study this subject and out of 10 how would you rate the importance of your love of the subject?

**Ryan Myles-Roberts:** 7 and 10 respectively.

**Aled Illtud:** 8 a 10.

**Aled Illtud:** 8 and 10.

**Benjamin Williams:** 10 - important for prospects and about a 9 or 10 - for how much you need to love the subject.

**Chris Lorch:** I chose to do the subject out of passion rather than career opportunities, I would rate at 5 and 10. There are very little options regarding space science in my area, and most other physics subjects. I knew it would be hard to find work experience and other forms of work. I feel like this would have put a lot of students off the idea of STEM jobs due to there

not being a wide variety in my area.

**The Enterprise and Business Committee:** Ben, we understand that you are currently applying for an apprenticeship scheme. Could you tell us about that?

**Benjamin Williams:** I have to send in a lot of CVs into companies but the main problem is that companies begin interested and then closer to the point where they want to take people on they either change what type of apprentice they need or may not have funding to take them on. However, other companies will not take anyone on until the end of the year when the courses are finished.

**The Enterprise and Business Committee:** Ben, did you have difficulties in securing that apprenticeship?

**Benjamin Williams:** I do not have one at the moment I am doing the extended diploma.

**The Enterprise and Business Committee:** Ben, who have you turned to for advice on the application process and are you finding it difficult?

**Benjamin Williams:** Friends who are engineers influenced me and the lecturers are very good. The head of engineering in the college and all the lecturers are very helpful with their input and letting me know when apprenticeships arise. It is not very difficult but just frustrating at times.

**Catherine Jones:** Hello. Sorry I am late logging in, but I have been having problems with my internet.

**The Enterprise and Business Committee:** Aled, have you had to compromise on the choice of research subject that you will undertake and have you been limited in terms of your choice of tutor?

**Aled Illtud:** O beth rwy'n cofio, ges i fy rhoi gyda fy nhiwtor i, ond mae yna ddewis o ddau arall. Rydw i'n neud traean o fy nghwrs yn Gymraeg. Yn lwcus iawn, ffiseg oedd beth yr oeddwn i moen ei wneud felly doedd dim rhaid i mi gyfaddawdu i wneud rhywbeth yn Gymraeg.

**Aled Illtud:** From what I remember, I was allocated a tutor but there was a choice of two more. I undertake a third of my course in Welsh. Fortunately physics is what I wanted to do so I did not have to compromise at all to study in Welsh.

**Y Pwyllgor Menter a Busnes:** Aled, beth fyddai'n dylanwadu ar eich penderfyniad i ddysgu neu beidio?

**The Enterprise and Business Committee:** Aled, what would influence your decision to teach or not?

**Aled Illtud:** Mae fy nhad i yn dysgu Ffiseg yn ysgol gyfun trwy gyfrwng y Gymraeg, ar hyn o bryd mae ysgolion yn cael trafferth ffeindio athrawon Ffiseg. Mae yna cymaint o alw am athro Ffiseg sydd yn apelgar, yn ogystal â'r ffaith fy mod i yn hoff o'r pwnc, sydd yn eithaf pwysig!

**Aled Illtud:** My father teaches physics in a secondary school through the medium of Welsh. Schools are finding it difficult to find physics teachers, there is so much demand for physics teachers, as well as the fact that I like the subject which is pretty important!

**Y Pwyllgor Menter a Busnes:** Pwy oedd y bobl fwyaf dylanwadol i chi?

**The Enterprise and Business Committee:** Who were the people who influenced you the most?

**Ryan Myles-Roberts:** In what respect? To do Maths specifically or my interest in STEM?

**The Enterprise and Business Committee:** Both.

**Aled Illtud:** Gwnaeth fy nhad, a fy athrawes Ffiseg; Miss Brooks ysbrydoli fi yn bennaf i neud Ffiseg, yn ogystal â'r hwyl byddwn i'n cael yn trafod y gwyddorau gyda ffrindiau sydd efo'r un diddordeb a fi.

**Aled Illtud:** My father and my physics teacher, Miss Brooks, inspired me to study physics as well as my enjoyment of discussing science with friends with similar interests.

**Chris Lorch:** My secondary school physics teacher was the reason I continued in physics rather than chemistry. He made the subject fun and appealing, as well as showing the class applications of the subject, which is hard to appreciate until you reach a higher level.

**The Enterprise and Business Committee:** Catherine, we know that you are hoping to do a PGCE at Bangor University. What has influenced your decision in that regard?

**Catherine Jones:** Hi. Being able to study it in north Wales and to be able to stay in my home area to so the school placements was a big deciding factor as I am a mature student, so money is problem. Although I did ring my local LEA, Wrexham, last week to see on what funding was available for the PGCE, I was spoken to very rudely and told to ring back next year, even though I tried to explain I needed to know about finances before I apply for PGCE courses in September.

**The Enterprise and Business Committee:** Catherine, you should speak to the postgrad recruitment office for advice at your university. If you would like to email Lord Dafydd Elis-Thomas who is the Chancellor at [dafydd.elis-thomas@wales.gov.uk](mailto:dafydd.elis-thomas@wales.gov.uk)

**Catherine Jones:** Yes, I have tried; however it is hard to pin anyone down on specifics LOL. I am going to apply for secondary science PGCE anyway. I am interested in making children engage with science, and making sure all children have the same chances to do their best in school. My parents foster children and I have seen too well how vital it is to make children realise that university is for everyone, and not just for what they see as geeks or rich people.

**Ryan Myles-Roberts:** For me to do maths specifically, it was my A-level maths teachers. They made the subject fun and appealing and I was just completely sold on the idea. My decision making process was 'I want to go to uni, what do I enjoy?' So I did.

**Chris Lorch:** I think one of the main things in our school which put people off STEM subjects was the lack of opportunity in local areas. Most students on my course including myself, know that if we want to acquire a job in the space industry it will likely mean leaving wales and moving abroad.

**The Enterprise and Business Committee:** Chris, have you considered looking into opportunities at GE Aviation in Nantgarw? Cardiff University has a research team that builds space telescopes. It is lovely to hear how much you love your subjects.

**Chris Lorch:** I had heard Cardiff and Aberystwyth have well developed space departments, however I only found that out through my own research and not through my secondary school. I am lucky enough to attend Aberystwyth University, however I find many of my friends in the university had a lot of information given to them from their secondary school during years 10 to 13.

**Ryan Myles-Roberts:** As regards my interest in STEM, I do not know how I was inspired; I have just always loved it ever since I started school and I have pursued it all the way through. My teachers all the way from Key Stage 1 through to the end of the sixth form helped though. Good teachers love their subject and they can inspire people.

**Y Pwyllgor Menter a Busnes:** Beth yw'r heriau yr ydych neu bobl eraill wedi'u goresgyn?

**The Enterprise and Business Committee:** What are the main obstacles that you or others have faced in pursuing your interest in the subject?

**Aled Illtud:** Mae'n bwnc anodd, felly mae digon o heriau yn eich wynebu chi. Bob hyn a hyn gewch chi un cwestiwn dydych chi fethu neud o gwbl, does dim ots faint o weithiau chi'n trial, mae angen safbwynt person arall mewn arbrofion neu gwestiynau ffiseg ambell waith.

**Aled Illtud:** It is a difficult subject so you face many challenges. Every now and again you'll get a question that you cannot answer at all, no matter how many times you try, you need another person's point of view in experiments or physics questions sometimes.

**Ryan Myles-Roberts:** Lack of self-confidence: a lot of people perceive STEM subjects as hard and ones where you either have 'the brain' to do it or you do not. Since starting my degree, every time I tell someone I study maths they always give me a look that's like 'Oh God, rather you than me,' and say something like 'I could never do maths'.

**Catherine Jones:** North Wales does not have many bioscience opportunities (unless you were interested in food tech or water companies). If I want to enrol on the NHS graduate scheme for my area, I have to go to England.

**Benjamin Williams:** Being given extra work on top of the engineering topics such as Welsh Baccalaureate which gives you less time to do the important topics which are relevant in engineering.

**Chris Lorch:** My biggest obstacle was finding work experience relating to my future career choice and further looking into jobs in the space sector in Wales; however, I found many more jobs more along the lines of my career choice existing outside the country. I agree with Ryan, there are a lot of stereotypes when studying a STEM subject, as well as students early on in their education being discouraged by these comments.

**Ryan Myles-Robert:** The big stereotype is that STEM subjects are perceived as boring.

**The Enterprise and Business Committee:** Do you feel that you are leading the way in your fields or stereotyped as 'geeky'?

**Catherine Jones:** Yes, young children, especially those from poorer backgrounds, assume science is not for them and is something that is boring and geeky and hard to study. They

don't seem to connect with science.

**Aled Illtud:** Nid wyf yn hoff o'r ffaith bod pobl yn ystyried ffiseg a mathemateg fel pynciau i fechgyn; mae hyn yn broblem fawr yn enwedig mewn perthynas â ffiseg.

**Aled Illtud:** I do not like the fact that people consider physics and maths to be subjects for boys; this is a big problem, especially with physics.

**Ryan Myles-Roberts:** I second that.

**Chris Lorch:** In relation to Ryan's comment on STEM subjects being boring, I feel more information should be given on where the techniques taught can be applied, and definitely as a younger student I was never confident to reveal what I wanted to do when I was older as it would result in judgement from classmates.

**The Enterprise and Business Committee:** Did you do any work experience before your course and were you supported in that or did you find your own way?

**Benjamin Williams:** Not so much in engineering and I had done work experience, but not in engineering.

**Ryan Myles-Roberts:** I did not do any work experience except the two weeks in year 10 and 12 but that was a waste of time for everyone involved. I had a job through years 12 and 13 in my local library but that is not related to Maths. I was not offered any support in school for finding work experience, though a friend got some paid work experience at a local engineering firm and he now studies engineering at Cardiff

**Catherine Jones:** I am quite proactive so I found work experience myself in my local Hospital, but it is discouraging, that if I liked what I saw in the local NHS labs, I could not train there.

**The Enterprise and Business Committee:** Catherine, have you approached Betsi Cadwaladr UHB about graduate schemes? Would you be happy for Lord Dafydd Elis-Thomas to discuss your issue with the chair of the local health board?

**Catherine Jones:** Yes please, the NHS options are limited for my area. Locally my trust covers only medical physics I think, so this limits my choices and means that if I wanted to return to Wales for post grad study, I cannot apply for the NHS scheme.

**The Enterprise and Business Committee:** How would you rate the careers and subject advice that you received?

**Catherine Jones:** I study in an English university, and they do seem to cater for English students and careers in England.

**Benjamin Williams:** I had good advice but discovered engineering was more exciting and seemed a better career path for me.

**Chris Lorch:** In secondary school, when I went to the careers adviser with specific questions I walked out with more of a goal than when I went in with. However when addressing the whole year group, I felt there was a lack of clarity in many aspects of the talk. It applied to the

average student but not specific inquires.

**Aled Illtud:** Ges i lawer o gymorth o'r swyddfa gyrfa yn Aber yn ddiweddar drwy'r Gymraeg, rydw i wedi cael profiad gwaith yn ysgol gyfun oherwydd hyn. Ges i brofiad gwaith fel technegydd yn orsaf radio tra roeddwn i'n ysgol - llawer o hwyl.

**Aled Illtud:** I had a lot of assistance from the careers office in Aber recently in Welsh, I had work experience in secondary school as a result, I had work experience as a technician in a radio station while in school - it was lots of fun.

**Ryan Myles-Roberts:** The careers advice I had throughout school was quite bad. It was all done through Careers Wales. Subject advice was given from individual teachers and they were great.

**Aled Illtud:** Yn gyffredinol mae cyngor gyrfa yn undeb Prifysgol Aberystwyth yn esbonyddol o well na'r cyngor oedd ar gael i mi efo Careers Wales yn yr ysgol.

**Aled Illtud:** Generally, careers advice at Aberystwyth University Students' Union is much better than the advice that I received from Careers Wales in school.

**Ryan Myles-Roberts:** The careers advice in Aber was how to write a CV and apply for jobs, but nothing really specific. It was in 1st year, and that's it saying that, I get a lot of good feedback about the careers office in Aber.

**Chris Lorch:** During chemistry classes in sixth form, we gained a lot of insight by talking to our teacher about his experiences. I had to organise my own work experience for my Welsh Baccalaureate award. The teachers were not determined enough to help me find work experience where I wanted to go. I had said about my interest in space science, but they were adamant to send me to a local oil refinery as it seemed to me as an 'easy option to get it over with' after that I organised my own work experience with lecturers at Aberystwyth.

**Aled Illtud:** Fel nodyn ychwanegol, mae'r cwrs Gregynnog mae Prifysgol Aber yn trefnu ar gyfer myfyrwyr Cymraeg yn feysydd mathemateg a ffiseg yn arbennig am ddatblygu eich CV!

**Aled Illtud:** On an additional note, the Gregynnog course that Aber university organises for Welsh students in the fields of maths and physics is excellent for developing your CV!

**The Enterprise and Business Committee:** Is there anything that you think schools, colleges or the Government could be doing to provide greater support? What needs to change, in your view?

**Chris Lorch:** In my view the biggest change should be to encourage STEM subjects from a lower year, such as year 9, 10 and 11 during their career choices. More applications for the lesson content should be taught to give clarity on its usefulness in the real world. More effort should be put into helping students who have specific goals in mind rather than giving them the 'overall average' options. By overall average, I mean that students with a specific goal, using my own experience, space science, will be offered work experience in an oil refinery rather than an observatory due to extra effort being required.

**Aled Illtud:** Mae angen mwy o bethau yn ysgol gynradd yn fy marn i: yr ychydig arbrofion gwyddonol oedd ar gael i mi fel

**Aled Illtud:** More things are needed in primary school in my opinion: the few scientific experiments that were available to

plentyn oedd rhai o fy hoff atgofion o ysgol gynradd. Hefyd, rwy'n meddwl bod angen, fel wedodd rhywun yn gynharach, dangos ochr ymarferol pynciau STEM i bobl ysgol gyfun.

me as a child were among my most fond memories of primary school. I also think that there is a need, as somebody said earlier, to show the practical side of STEM subjects for secondary school pupils.

**Ryan Myles-Roberts:** They need to inspire children and young people into STEM through an innovative, practical and thought provoking curriculum starting as soon as, or even before, they get to school. Continue to move away from the 100% textbook idea and take it into the realms of practical things. The best thing for me was doing physics and chemistry safely. Teachers who have come just out of their PGCE are great but they cannot understand fully what it is like to apply these things.

**Benjamin Williams:** Schools could do with teachers having more experiences in actual fields such as in industry etc. which would give children a bit more knowledge of the fields they want to go into.

**Aled Illtud:** I second that! Brilliant point.

**Catherine Jones:** Yes, I agree.

**Aled Illtud:** Perhaps even get guest speakers every now and then to inspire pupils.

**Ryan Myles-Roberts:** Guest speakers are great: all the way from primary through to degree level.

**Chris Lorch:** I agree with Aled and Ryan: guest speakers from STEM subjects would definitely encourage students and help rid schools of stereotyping STEM subjects as boring and geeky.

**Benjamin Williams:** Yes, I agree with Ryan: it is a good idea for this chat.

**The Enterprise and Business Committee:** Did any of you have any guest speakers?

**Ryan Myles-Roberts:** Not that I can remember.

**Benjamin Williams:** Yes, but only from the forces with engineering experiences which is good but you want to see some other parts of the industry.

**Catherine Jones:** Yes, but I think having teachers who are inspiring and passionate about their subject area and who, most of all, really care for their students and their futures is most important. Children need to hear very early on, that what they are able to do is only limited academically and limited by gender, social status or money.

**Aled Illtud:** Yn yr ysgol gyfun, cawsom ni lawer o siaradwyr gwadd ar gyfer y chweched dosbarth, mae'r system yma dal i fynd fel. Mae hyn ar y cyfan er mwyn ticio bocsys y Fagloriaeth Gymraeg, ond dwi'n cofio ambell sgwrs gyda gwyddonwyr a

**Aled Illtud:** In secondary school, we had many guest speakers for the sixth form and that system is still in place. This is mainly to tick boxes for the Welsh Baccalaureate but I remember some conversations with scientists and colleges as a result which was helpful in

cholegau o'r herwydd, nath rhoi lot o gymorth i mi wrth ystyried ffiseg fel pwnc prifysgol.

considering physics as a university subject.

**Chris Lorch:** We had a day where some people from QinetiQ gave a talk, which I feel did help students.

**Y Pwyllgor Menter a Busnes:** A oes unrhyw beth yr hoffech ei ychwanegu cyn inni orffen?

**The Enterprise and Business Committee:** Would you like to add anything further before we conclude?

**Ryan Myles-Roberts:** Thank you for the opportunity to take part.

**Y Pwyllgor Menter a Busnes:** Diolch ichi am roi o'ch hamser a hoffem eich dymuno'n dda at y dyfodol.

**The Enterprise and Business Committee:** Thank you for your time and we wish you well for the future.

**Chris Lorch:** Thank you for this opportunity; I hope it helps.

**Aled Illtud:** Diolch am y cyfle yma. A diolch i Celyn am roi lan efo fy Nghymraeg i!

**Aled Illtud:** Thank you for this opportunity. And thank you to Celyn for putting up with my Welsh!

**Y Pwyllgor Menter a Busnes:** Byddwn yn siŵr o'ch diweddarau ar yr ymchwiliad wrth iddo ddatblygu. Mae'r gwe-sgwrs ar ben. Diolch yn fawr iawn i chi i gyd.

**The Enterprise and Business Committee:** We'll be sure to keep you all updated on the inquiry as it progresses. The webchat is now over. Thank you very much to you all.