**JERRI – Joining Efforts for Responsible Research and Innovation**

**Realising institutional change within large academic organisations**

Structure - Interview Analysis

**Section 1 - Evolution of dominant narratives** (dominant storylines, existing institutional logics)

**Section 2 - Maturation process** (emergence/maturity/resilience - how deeply is it integrated into daily routines/organisational culture?)

**Section 3 - Systemic consolidation** (common concepts across the organisation, impulses overflowing into other spheres)

**Section 4 - Vertical multi-level alignment** (coherence with governance levels within the organisation and with its external environment; coping with multiple institutional logics/conflicting goals)

List of Interviewees

**1. Double Interview: (a) Professor and Associate Dean Graduate College (Faculty) and (b) Director of Graduate Support Resources (Staff)**

**2. Interview with Associate Professor in Humanities (Faculty)**

**3. Double Interview with (a) Professor at Herberger Institute for Design and the Arts and (b) Dean and Professor at Herberger Insitute of the Arts (both Faculty)**

**4. Interview with Physics Professor (Faculty)**

**5. Interview with Director of an interdisciplinary research center (Management)**

**6. Interview with PostDoc at the School for the Future of Innovation in Society (Faculty)**

**7. Interview with Director of one of ASU’s initiatives (Management)**

**8. Interview with Associate Professor at the School of Sustainable Engineering (Faculty)**

**9. Interview with ASU’s management board member (Management)**

**10. Interview with College Dean (Faculty)**

**11. Interview with PhD student at the School of the Future of Innovation in Society (Faculty)**

**12. First Interview with Instructional Professional at Watts College of Public Service & Community Solutions (Faculty)**

**13. Interview with Professor at School of Human Evolution and Social Change (Faculty)**

**14. Interview with Associate Professor at the School for the Future of Innovation in Society (Faculty)**

**15 Interview with Assistant Professor at School of Electrical, Computer and Energy Engineering (Faculty)**

**16. Interview with English Professor (Faculty)**

**17. Interview with Professor at the School for the Future of Innovation in Society (Faculty)**

**18. Interview with Professor at the School for the Future of Innovation in Society (Faculty)**

**19. Interview with Associate Professor at the School for the Future of Innovation in Society**

**20- Interview with Professor and Dean at an ASU school (Faculty)**

**21. Interview with Director at an ASU school (management)**

**22. Interview with Director of an ASU research institute (management)**

**23. Interview with a Physics Professor (Faculty)**

**24. Second Interview with Instructional Professional at Watts College of Public Service & Community Solutions (Faculty)**

Analysis

**Section 1 - Evolution of dominant narratives**

* I like the **openness**, I like the sense of commitment to the community, I like the one phrase that **we are defined by who we include, not by who we exclude** so we want to educate everybody regardless of their educational background, socio-economic status and everything. But I came here because of the **openness to research.** My research projects at those times were heavily involved in mathematicians and chemist and I really like this commitment to open research. **commitment to community** **and outreach**(1)
* We are designing structured programs where students can receive credit for coming and thinking beyond their research and so the students are coming here to produce research and knowledge that will end up in their dissertation. But what we also want them to start thinking early on in the first year courses **"who else would be able to have access or use the knowledge that they are going to be producing at the end of their degree... Who else besides your direct audience may find your research of use... Who is your indirect audience".** Thus making sure their **research is both accessible and engaging**? They should be able to communicate the value and relevancy to members within academia and outside of academia (1)
* We have the **institutional mandate to** **be engaged with the community** and to **encourage interdisciplinary and transdisciplinary** work more of it does happen at ASU and more of it feels supported at ASU which is wonderful. But I think at the same time, I think what is wonderful about ASU is that we have that kind of...we have the charter and we have the side principles that suggest that we should be doing this kind of work (2)
* We would like and we have been advancing the broader notion that **the institute needs to be really driving change and creativity across the campus** so every research team funded out of (...) should have an artist or designer embedded in it (3)
* I think at **ASU this kind of work is certainly encouraged**. It is also true though that our department is quite committed to other kinds of work in race and class as well, race more than class I would say. I mean our location makes all of us who work in humanities care, maybe not all, many of us care **very deeply about questions having to do with immigration and migration and diversity** and so I think that that might be one of the reasons that we see commitment to that. (2)
* You **provide people with a lot of freedom to try new things that are really exciting** and interesting to them, and then you say yes, **go and work with the engineers or go and work with the physicists or go and work with the biologists and do something you couldn’t do somewhere else**. That’s **what’s so attractive** and so exiting to people when they come and with good reason. They end up doing very interesting things. (4)
* So, where I think ASU has done a very good job in that regard is that the **people thinking about that problem**, they’ve thought about it as a necessary activity in **helping the science go forward rather than trying to contain the science.** Because, as soon as you try to contain science, then the scientists will revolt and they will stop listening to you. But, if you frame it in terms of them being enabling of you to find new, interesting areas and new funding sources and new opportunities, then it changes the relationship. So, generally speaking, there’s been a much **better relationship here over this period of time, between the ethicist, the societally oriented people and the scientists** than in any other institution that I’m aware of, in that regard. (4)
* **New way of thinking:** What social **scientists have developed are systematic ways of asking what the effects are and could be on the world**. And, those tools are actually then very useful when I’m thinking about what I’m going to do to take this outside... I always thought well, okay, anyone can tell a story, but actually the **social sciences have gotten very good at systematically telling different stories and asking what those stories mean and how they work,** and so that’s useful it turns out. (4)
* There is always value in **reaching outside one’s comfort zone**. (5)
* There was just **a universally accepted goal, not shared by everybody but shared by all the active people in the university, who are now probably approaching 100% of the faculty.** But in those days, even if it was just 10% of the faculty, there was just a shared **goal to do things better than other people expected ASU to do them**. So, there has always been a march towards improvement and in general, if you have wanted to approach the administration about doing something new or better, there has always been a positive reception. With **Crow, we have crossed the critical threshold now**, where the overwhelming majority of the faculty are great, productive people. (5)
* **ASU is definitely a top notch place, at least in the US, for that type of research (impact motivated research)** but they really pride themselves on being innovative and **having their work extend beyond just sitting at a desk and not really having that broader impact within society**. (6)
* We can have all the data in the world on where they go and how they use their habitat but if **we do not try to solve this problem more holistically, that scientific knowledge in of itself is not going to do anything**.... That is, I think, a problem within conservation is that a lot of people just look at it from, how can we protect the animal, and I think people kind of get the short end of the stick. A lot of times, like these researchers had not even talked to fishermen. (**Knowledge for itself is nothing. Knowledge needs to change behaviour**). (6)
* ASU different to other places: That is when I was tracking the turtles, and just realised **we are collecting all this data, for what? It is not going to help them.** All the **conservation biologists and the scientists were like we need to know where they are.** We cannot protect the turtles unless we know where they go and how they use their habitat, it is like you know what? That is true, but what **we really need to do is work with fisherman** because we know that all these turtles are dying in the fishing nets. (6)
* I knew that **ASU was widely known as being innovative** and so I definitely thought that it would be a good programme for me. (6)
* For me, it was a source of pride because I was like this is great, **I am at a place that values what I do and at the end of the day, you cannot ask for much more** because that is all any of us really want. You like to be valued and you **like to work in an environment that you know kind of believes in what you do**. I felt like even though I did not win any awards, **I felt like they always supported me**. (6)
* I have also heard that the whole well**, if you do not understand the biology first, none of this matters.** Whereas **I look at it the other way. If you do not work with the fisherman, then the biology does not matter** because we are not going to have any sea turtles in 20 to 30 years because they are all dying. (6)
* **New American University**: When I think about the concept of the new American university I kind of precipitated into **two key pillars**. One is **accessible, high quality education**, so basically this notion of, if someone is qualified to get a college degree they should be able to, and **the other one is impactful inter-disciplinary research**. (7)
* A lot of that is really focused on making sure we understand the problems of the people that may or may not fund us. Like, **what are really the challenges that are out there?** We are an institute. **Our mission is Security, so we do not usually do things just because it is interesting. We do it because there’s a problem out there, so it is kind of fundamentally focusing on that impact**. (7)
* Why not take a differentiated approach to solving the problems of improving health or sustainability of national security, by taking inspirations from nature? That is the basis of the Biodesign Institute. That is, have a differentiated mission. Also **have a mission that is based on bringing people across disciplines, being able to work together without barriers, so that we might produce outcomes that are meaningful and have impact**. (9)
* And one of the things Crow likes to say is **that ‘The success of our teachers is defined by the success of our students. The success of our directors is defined by the success of the faculty. The success of the deans is defined by the success of…**’ He takes the work chart and he turns it upside down. That **your success is defined by the success of whoever reports to you**. And **the implication is that your job is to empower the success of the people who report to you**. You work in the service of the people below you in the traditional work chart. And that is again a new **mental model of leadership as responsibility rather than as privilege**. **And even after 15 years it is hard to change the mental models of people who are raised up in academia**. (8)
* **If we think that we know, you have shut out the possibility of innovation**. (9)
* **Our purpose is to solve public problems.** (10)
* **Lots of universities say, and lots of universities in/and lots** of entities within ASU even, to some extent/say: well we are educating and we are doing research**, and one of the benefits that we create along the way is that we address some need in the community**. And I am trying to argue that **we are flipping that a little bit**, and say: no, **our purpose is to solve some problems.** So we look around and **we see homelessness or we see crime or we see behavioural health problems**, or we see **inequity in different communities and we say: well, we are going to/what can we do to address that**? And then the question is well, this is what we can do to address it, **how can we do it in a way that also addresses our educational mission and our research mission?** And so it is not quite the same, right, because now instead of viewing those pos/those benefits as our positive externalities, I am saying: no, that is our purpose. (10)
* When they ha**ve a specific mission, we try to develop projects that address that mission because it aligns with our mission of creating impact and making a difference societally**. (9)
* **Universities are underestimated as institutions**... But they also have the history and in my opinion even more so the **potential to be actual agents of change in society**; coming up with ideas but also prototyping them and implementing them to deal with some of the trickiest problems. (10)
* ASU as a university I think is pushing this frontier. (10)
* We are sort of more si**ngle-mindedly focussed on public goods rather than private goods**, right. So lots of universities are doing innovation like starting businesses and doing these things, **we are doing that too. But we also take it as our responsibility to try and solve problems.** (10)
* You have us **using our power as a university**, we have students who want to learn and we have knowledge about what kind of interventions make sense. We **take that capacity, we use it as an asset**. (10)
* We **advance the public good by using the basic capacity of the university in creative ways**. (10)
* **We wanted something that captured this idea about solving problems, promoting an idea of public goods, public service**. (10)
* I/we wanted to **create a unified sense of purpose** around/again, the same things that you are talking about, **solving problems, public service, building stronger communities, building more resilient neighbourhoods and cities**. And so we created this shared purpose and in some ways the name was the sort of stamp. (10)
* One of the reasons why I am interested in this vision of what a university can be is it is a way of **doing public service, it is a way of being active in the world**. (10)
* I am not super excited about s**omebody who just wants to write a bunch of really good papers and pub**lish a bunch of really good papers. Even if they are very good at it. That is just not/that is not consistent with what we are trying to do. **I want somebody who looks around and says: well how can I do something that addresses that or how is my scholarship relevant to the world**? (10)
* So just doing a project **is not research**. Bu**t doing a project and then learning from it and publishing findings from it, that is research**. Teaching, now all of a sudden **if I involve my students in these activities and do these activities in the community as part of a pedagogical exercise, that starts to become teaching**. (10)
* if you think about where the challenge is as universities do this, this is going to be a challenge which is how do **universities** change their mindset so that they **are viewed as a friendly partner, not a bunch of arrogant intellectuals who think they know better**. (10)
* a large focus of his administration (Crow)... make a cul**ture where more people are working across disciplines**. (12)
* **Responsibility - responsibility in research means being as thorough as an investigator** and I speak not just for myself but I mean imparting a sense as a whole research group... Even if it does not get us into the highest impact journal or sound the most exciting right? **Not sweeping anything** **under the rugs** I think this is part of being a responsible scientist. (15)
* I think means and **consistent with ASU’s missions** I am really hundred percent behind president Crow when he talks about us as a university seeing our value as the **difference between students walking in the door and students walking out of the door.** That is our value at, right? So, part of that responsibility is as in a structure is bei**ng accepting of all the students who walk in** the door ... (**teaching responsibility**) (15)
* this comes right from the president, u**se inspired research is one of our important values.** Social embeddedness and being relevant to our local and global communities, these are all important tenants of ASU. (15)
* Responsibility: **In the long term so thinking about how to innovate responsibly not just, you know, throwing new technologies at problems** because we have new technologies. And that is something that I see as a health care provider from the perspective of caring for patients. You know, saying “Oh we can treat you with this thing”, but **without any discussion of what the impact of that may be on society, on the person, on the person’s family, a year, five years, ten years** down the road. (17)
* The observation that resear**chers often prefer to distance themselves from policy preferring this notion of purity in science.** Which **I think is not realistic and problematic in the same way** I think that we have got a big problem in that we have prioritised randomised controlled trials as being, you know, the pinnacle of this is how one creates knowledge. And the fact is, the knowledge that is generated by a randomised controlled trial does not reflect for health care provider the knowledge that I need to apply to my actual patient who is not controlled. (17)
* **Responsibility**: Trying to think about research questions, the way **that I think about responsible research and innovation is, is it is this impetus to frame your question with multiple time horizons**, right? So, you have got your immediate, you know, research outcome - what are your statistics show you? But then trying to think through, ‘okay if I do this project to show this outcome, **what is going to be the impact in five years? What is going to be the impact in ten years’. So, that broader time horizon but also a broader impact horizon** in trying to think through the impact of a single research question on a broader socio-technical system that that research question is situated in. (17)
* **Responsibility/Impact**: responsibility sort of **anticipatory thinking with regard to innovation. I used to think about innovation,** particularly technology, a new technology innovation that, you know, that if you can build it ,right? Then you should build it because it is called build new stuff and then we will figure out what it is going to do? Well that is completely backwards. **We ought to be innovating, you know, according to need, to use.** We should be **really inspired by use rather than build neat stuff and then find ways to use it** which is not to say that we do not build neat stuff and then find ways to use it. But, we should be starting, we should be backing up and be building neat things to solve the actual problems. (17)
* **Responsibility**: I try to **think responsibly is this expenditure of money** whether it is to the patient or to the insurance. (17)
* Responsibility/RRI: to focus on the RRI aspect of it all **with an eye towards thinking about now before the technology is out and in, available for public consumption and public control or private control in the hands of businesses** and **what can we do to ensure that we get the societal benefits out of the technology and avoid some of the negative impacts**. (18)
* Use inspired research: I think **basic research is seen as, you know, very important resource** and I guess the third reason would be because of this wonderful **phrase; ‘use inspired basic research’. This allows you, you can have entire university doing nothing but basic research but you are thinking also about the context of application; who? What? When? How? Where? Why?** Would this research be of interest? So, presumably by thinking about it you are also talking about it, you are opening up opportunities, maybe not you directly, maybe someone else in your lab or someone else in your school or someone else in another department. (19)
* **Responsibility**: I think t**he public institutions we really do have an obligation to impact our place that is in the community we should make a difference** and so, that like I think a very significant piece of that. (20)
* **Doing responsible research as a public institution is to demonstrate to the public the value of that research and its impact**. So, for us that means really seeking ways where, you know, do faculty have opportunities to translate their work. (20)
* **Impact / Responsibility**: We think about **responsibility for our community, force of livelihood. Not just the number of start up companies and patents but really the quality of life by producing great graduates who add value because they are high value employees and B) other impacts for example through our research that again, add value, create wealth, improve quality of life and so forth**. And that is a very, that is one very important measure of responsibility but when you think about here with this initiative responsible research and innovation are there many different ideas about what it means to be responsible or are there a few or what is the current thinking? (20)
* **Use-driven research: even though we do basic research we are always looking for ways that the research we do can be developed into products that can help society**. And so, we do vaccine research and we are starting to look at use of viruses to treat cancer and we have other expertise on that at ASU as well. (21)
* The right phrase would be re**sponsive, being responsive to people rather than being responsible**. (23)

**Knowledge Enterprise / Entrepreneurial University / Transfer driven**

* We want the **mind-set like a corporate**. **Taking responsibility for our own evolution, for our own future**, but yet be comple**tely grounded in the public mission**. So then that term is an **enterprise**. An **enterprise takes responsibility for its future**. But then what are we? What is our enterprise? **Our enterprise is about knowledge**. It is about ideas that people generate in the university. It is about the people that we generate who have those ideas, or will have future innovative ideas, or the kinds of things that we build in the **university that causes impact**.(9)
* You are **taking responsibility for your local, regional, national and global communities** to be better and therefore **create impact on those communities** **by what you do**. And so that is a missi**on that a knowledge enterprise ought to take**…is you not only generate fantastic ideas, that you also generate or inspire future thought leaders and build lifelong learning skills, master learners... How might we be the **economic engine**? (9)
* So we work with **private philanthropy**. Or **foundations**, like the Gates Foundation, Dalek Foundation, or the Forbes Foundation, or the Carnegie Foundation. Mellon Foundation. Wh**atever the foundation might be, the foundation has an objective, a goal, a purpose**. (8)
* We have a project that would provide better services to those children, that would do some sort **of parent training for parents while they are imprisoned**, that would have better experiences for the children when they visit their parents in prison, a whole set of things. **And the entity that we are applying to for funding has never funded a university before because they fund social service agencies. And they look at us and they are like: we are not/we do not/we are not interested in giving money to a university**. And we are like: well, I understand that b**ut we are not like another university and we are not asking you to pay for scholarships or whatever, we are asking you to pay for a direct services to this client**. But they are sceptical of that. So I think that is an issue. (10)
* So, it therefore seems that **any sort of futuristic planning about biotechnology needs to ask the fundamental question, “Is anyone going to use this invention or discovery, and if so, what is the likely market impact going to be**?” Otherwise, it is very abstract. Now, in an area like fundamental physics, I think that of course is a different sort of impact. No one is trying to address a market, but in biotechnical, most people are. (5)
* the only **thing that matters is something that can be propagated through markets**. (5)
* So **we strategically use that to invest in certain initiatives**, like the **Biodesign Institute**, like the **Global Institute of Sustainability**, like the **Global Security Initiative.** So that we might work **on problem sets that are important for Arizona, that is also capable of attracting other kinds of investments**. (9)
* The other thing that happened was **around 2007** is the universities really started/they/there was a **huge divestment of State investment between about 2007, 2010 following the recession.** So another thing that has been a major factor in schools/well, being in the last/within the last decade that we have been here is been **figuring out how to develop new income streams and be able to pay for the types of initiatives that we want to do.** So there has been a **devolution of budgets** in that time with the Dean’s office and so on/ fewer resources and units are expect**ed to develop new ways to bring in resources to the table, whether that is development, online teaching, we do it through summer programming** and so on. (13)
* We do not need everyone to be doing the same thing. But **we do need people to be excellent, we cannot be carrying people**. So **find a thing that you can be really good at and then go for it and sell it**. (13)
* So at the unit level that is kind of where I am and obviously as a unit leader that with a very, **very large budget there is also the need for being very responsible with money.** Very, very respond/every dollar you use you need to be **thinking exactly how you are using it to advance the mission of the school**, advance the faculty staff. (13)
* **ASU I guess it is more business-like in the sense that/but knowledge production** can be part of the thing that that time gets spent on. (13)
* we thought what **other parts of this teaching can we scale in ways that would be successful for students** and then we did that. And we did a lot of **collaborative work with faculty work together to develop online platforms that bring expertise together and then can be teached to a lot of students at once**.
* So **faculty now required to be more innovative in how they teach, they are required to be more collaborative in how they teach, they are required to teach at scale.** But as a result we are able to suit more students, **bring in more money and ultimately have more resources and more time for research**. So everybody wins. (13)
* start up companies - **ASU is pushing very hard on entrepreneurship** and tracking. (15)
* But it is realising that **there needs to be some vehicle that goes between university and regular people and companies are one such vehicles** and so if we track sort of number and success of companies then maybe we get some **feeling for social embeddedness**. (15)
* **Impact Orientation** - I believe that the **biggest mistake in university research at present is working on the wrong problem**. We spend a lot of time thinking, ‘hmm I know this is a technology problem and if we solve this we would make the world a better place and we could go sell these widgets or gizmos and gadgets’. And **often we are wrong, and the reason is because we are sitting in the middle of a university, completely isolated from the companies** that would actually want to purchase this technology and then sell it on to customers. (15)
* **ASU is really good about handling intellectual property through AZT** – Arizona Technology Enterprises. (15)
* There is a vision, there is a style and that **ASU really embraces change and as an organisation it is very entrepreneurial. Which means that it is not sort of a slow moving reflective project driven by moral philosophers. It is a fast moving, growth orientated** organisat/, you know, driven by organisational scholars (19)
* For us that means really seeking ways where, you know, do faculty have opportunities to translate their work, okay? It might be **through licencing their technology. It might be through starting up a company. (20)**
* I would say in the **context of, for us it means more industry participation, corporate sponsorship, having conversations** with… One way to think about it **right with industry or corporations is some, they might be viewed in some sense as consumers – either hiring our students, you know, interested in the output of a research project**. Potentially collaborating right, you know, bringing one of their engineers together with one of our faculty to work on something. So, from that perspective we have very significant activity. (20)
* I mean **Boeing is here and they do a lot of assembly and manufacturing**. Their needs tend to be the same okay? **So, we kind of understandably listen to them and try to find out where their needs are really the most acute and then try to structure a program where we can engage them and help them**. (20)
* So we have on the one hand **the state support and then on the other hand through our online initiatives which we are developing a rather huge online set of courses and degrees.** That money goes to the departments who develop or the schools that develop these programs so **that becomes a way of generating resources but resources are tight**. (22)

**The role of Arts / Creativity:**

* historically **art and design focuses on two main things**, the **dissemination of knowledge and the building of craft and skills** ... **transformative potential** of the tools of the artist and designer in non-art spaces (3)
* there are **practices that artists and designers bring to any community** that they are part of that actually **help transformation occur** which means they **help discovery occur** which means they **help change occur** and that is **necessary for innovation** and excellence and collaboration and all these kind of team settings that make this place different than a lot of other spaces (3)
* when artists are doing that work outside an art space we b**ring imaginative acts and expressive actions into group process** whereas new processes are often thought of as very linear rational kind of brainstorm which might kind of lean into the **imaginative and improvisational...** The artist is not trying to change how someone else is thinking but the artist is trying to build their work alongside an adjacent so that they can connect in a powerful way. .. It is also interesting to think about how **artists** move from research teams into being **community contributors in lots of problem solving and transformation** of effort. There are a lot of artists and designers doing lots of spaces and we are certainly engaging artists in that and training them for that as well. (3)
* as researchers attempt to gather data from people in community the artist on the team could also be very effectively powerful and engaging in getting people to reveal, to share information/experience that a researcher may not have access to. (3)

**Inclusion**

* We do not measure ourselves by who we exclude i.e. everybody else does that, **we measure ourselves by who we include** and how well they do. (3)
* I would rather work at a **place that cares less about status and more about ideas.** (3)
* And I think in all of those cases the **culture should be one of inclusiveness**. Again, this is an ASU core mission which nobody has to force me to do, it is easy to get behind some of these values of ASU. So, one of inclusiveness, of **open dialogues, one in which nobody feels hesitant to speak, one in which we are, yes we foster creativity** and we… Creating environments in which everybody feels like they are participating and having something apt. (15)
* So, we have students who I am thinking, ‘wow how did you not learn this in elementary school?’ to students where it is like, this person is fantastic and is a going a long way, right. And maybe w**hat ASU does that it unique is tries to squish all of these together and move them along** before sending them out the door. (15)
* So, I think **we try to be inclusive in the hiring process of faculty but not inclusive in terms of skill**. (15)
* I actually think **we should focus on underrepresented populations** and I think there are two, there are a number of reasons. One reason is; we can, those students can get placed more easily. **There is a shortage in the country of good, strong academics from under represented backgrounds**. We are a largely Hispanic state, if we just said our programs and the humanities are going to really make a special emphasis on recruiting students of a Hispanic background and giving them the education to go out and get jobs elsewhere is going to have two effects. One it is going to be more successful because our students are going to get jobs, but the other thing is with students from, who have not been born and bred into academia by parents, by a lead education, by undergraduate – this is the line to get to be a professor. (16)
* And that is **part of being inclusive, being inclusive does not just mean being inclusive on the people we bring to this campus. Being inclusive is going out and finding people in rural Arizona that cannot come to this campus. Finding people in, you know, poor Africa that cannot come to this campus**. Those are I think some of the real exciting things that we are doing, that sometimes people look at, “Oh it is just a way to make money”, but really it is not just that. It is a way to bring this education that we think is so important to as many people as we possibly can. (21)
* Towards inclusion of people from all sorts of backgrounds as not just "Aah, they can do it too" **but as an untapped resource and furthermore, a necessary thing for this university to serve the broader environment in that forum**.

(23)

**Social Embeddedness**

* We are advancing research and discovery, public value and assuming **fundamental responsibility for the economic, social, cultural and overall health of the communities and services**. (12)
* We **should be responsible for the communities where we reside instead** of just sort of physically sitting in them. (12)

**De-facto responsible research and innovation (understanding of responsibility in science)**

* Interdisciplinary research and outreach (1)
* Ethical sensibility and integrity training (1)
* Less status - more impact (3)
* Social Embeddedness (12)
* Responsibility with money! Knowledge Enterprise/Entrepreneurial university (13)

**Section 2 - Maturation process (emergence/maturity/resilience)**

**Interdisciplinary Science / Impact orientation:**

* ASU (and BNI) contributed a substantial amount of money, a few hundred thousand dollars a year to the **interdisciplinary graduate** program to make it work... And we set it up, it grew very fast, the program now has 30 or 40 PhD students in it, we have graduated probably two dozen (1)
* I was asked to **set up a neuroscience major**. Here again we had a problem **because neuroscience is affiliated with so many academic units**. The moment you set up an impulse to such a major it must be administered by an academic unit. The units get money for the students. And the students count toward the unit. **But we started a new way of setting up majors** and they can set up a concurrent major whereby students can take a few extra hours over and above the number they need to get their undergraduate degree and they get two degrees. One in biology, one in neuroscience, one in psychology, one in neuroscience, one in engineering and one in neuroscience which I really like because first we avoid the conflicts across the units but more important than that was it really reflects the true way that neuroscience works, it is very interdisciplinary (1)
* So what the **interdisciplinary graduate college** does is it provides programming that **allows students to come together from different academic units** to speak to their research and how that research might be applicable to other programs. We have a **first-year graduate course** that I developed called **Interdisciplinary Research**. Here they are learning about interdisciplinary work, what does it mean to conduct interdisciplinary research. So in this first year course students are introduced to the new American university, they are put into groups where they are working with other students from different majors to solve a problem that they have to identify (1)
* What the college also does, in terms of having that voice and **bringing an outsiders perspective to the table** and contributing to conversations, we are also able to spearhead the platforms where it brings people together to start having these conversations around **mobilising knowledge** (1)
* If there are conflicts or things at the academic level that graduate students need to appeal they go up to their college within their academic unit but many times **the colleges will then also consult the graduate college** as well (1)
* The **graduate college is independent of the academic units** (1)
* The graduate college can have a perspective on interdisciplinary programs that an **individual unit usually does not have** (1)
* What we want to do is a **workshop for PhD students** where you bring in people from different disciplines. You have an objective, an outcome and you tell them to be creative and form small groups of teams of, in my case, a physicist, a mathematician and two neuroscientists, and use the skills representative on your team to define a research project that could not be done by any individual person (1)
* Variation: If you look at the departments, you may find some/a lot more interdisciplinary research and school of thought taking place in the stem fields versus the humanities fields. Not because they do not want to, they just have not really figured out how to adapt that model through their curriculum (1)
* **Team-driven Phd-projects?** Students in this program are proposing will have at least one component of their thesis that will be evaluated based on a team and based on their interactions with the team so we will be able to track every person who had input into this thesis chapter and it will be the same thesis chapter for everybody, we will be able to track the input that everybody had into it (1)
* The **interdisciplinary science and technology buildings** are buildings that **are not given to any academic unit** to administer (1)
* We actually have sort of two models that we are operating with at the same time. One is just a very traditional model that you see in lots of humanity centres in the United States which is **a tiered funding model where we function to help the faculty find each other and collaborate across disciplines in research clusters** and then they can apply for seed grants (2)
* The **ensemble lab** is a space where we are trying to establish an opportunity to bring all of our other work through here and intersect it with students and faculty to experiment. ... with online education, we are all creating online experiences and the ensemble lab is a space that folks come in and ask us to consult and work on other ideas across campus. (3)
* I think that more and more people ha**ve been willing to engage the social scientists and the artists as well. So, it’s actually pretty widespread at this point among laboratories**. (4)
* ASU is a **fabulous environmen**t so that **if somebody wants to do something that crosses disciplines in a pretty extreme way, there is a very high chance of finding someone you can work with** and there are links to the law school as well as David Gaston’s Centre and arts and so on. (5)
* One of the things that I have observed is in our security landscape there is a **tremendous need to work on very complex problems** **which fundamentally require inter-disciplinary solutions**, and **most of the organisations that exist to advance security challenges tend to be very technology-only-centric**. I am a technologist, I am a computer scientist but I have a deep appreciation, and this is something that **I really credit ASU with opening my eyes to, for the need for Humanities and Social Sciences and inter-disciplinar**y, and that is kind of how the Global Security Initiative was born... there is a **deep need to address these complex issues**, the **complex issues require inter-disciplinarity, ASU is a leader in inter-disciplinarity**, and we have an opportunity to really make significant, positive change (7)
* Then we also have a **Human Security Collaboratory** that will be developed into a center over the next couple of years. That is **co-led by an English professo**r, Professor Jaque Wernimont **and Dance professor**, Professor Jessica ..., **focusing on how to understand how we experience everything in this digital environment**. So, considering issues like ethics and algorithm bias and algorithm transparency, with the leadership from a Humanities and the Arts side. That is four, we have a total of eight pillars so the other four pillars in development are Resource Security pillars, Human, Health Security pillar, Economic and Urban Security and then Decision Making and Complexity, so those are kind of our eight areas. (7)
* The **money for the investments for institutes and initiatives, and I am pretty certain it is the same at Biodesign NGOs, it comes from TRIF**, Technology, Research and Innovation Fund, which I am sure Panch has talked to you about. (7)
* **Building/Location**: Our research scientists are here, all of our staff are here, and then I would also say that this is an amazingly awesome building. It is a super cool building and it is nice to walk around and **talk to the people that are working on earth and space exploration and people that are doing water research on other floors**, so I do feel very fortunate about being in this building. (7)
* **Nobody has invested as much in sustainability as ASU** has. (8)
* All this **cross disciplinary work is an effort to organise knowledge around the problem** we are interested in **rather than around the discipline**, and **ASU is an easier place to do that than a lot of other places** are. (8)
* Problem: Retaining People! It is a **challenge to inter-disciplinary work. So ASU has done a good job of hiring**, and in the last 15 years we are now in this new phase of retaining. W**e have attracted people who are attracted to the missio**n and attracted to **the ideals of the new American University**. But **we have not shifted from a focus on attracting new faculty to keeping developing and keeping the faculty** that...the shift has started but it has not been completed. (8)
* But what **we will not do in engineering yet is promote our own people early**. And there is this bias. There is sort of…, the grass is always greener. Like many universities w**e are more attracted to people who are outside our own university,** and then when they come in somehow we are critical of them, more critical, maybe because there is a familiarity by us or something I guess, I think that is as backwards. We scour the world to try and find the best people. We should keep investing in the best people when they are here, to accentuate their strengths. But I think there is still a conservative attitude in many universities and it exists at ASU too (8)
* Value interdisciplinary research: I**t can be a separate committee of people that is made up of people** - computer scientists, anthropologists and people who are working across. So such a structure, if that is made possible by the upper administration, it's great. (9)
* If the **top-down is also not working, it will never change fast enough**. So here **we have taken an effort to apply the top-down where necessary**. **Now our faculty are much more** because of the fact that I said to you…the new culture that is there in the institution, **we do not have to intervene much at all, because faculty are naturally inclined to appreciate, acknowledge, and reward, and recognise people who work across disciplines**. It has become more a part of the culture of the university. (9)
* I am very broadly engaged in how I have always done research, **I have always worked on these very transdisciplinary topics like infertility and obesity and climate change** and so on. (13)
* **President cares about social science**... he has **personally invested money to activate.** So when this happened he actually invested presidential funds to start projects that were **collaborative between the different people on different parts of the school**. (13)
* **People really felt valued by the administration**. (13)
* It (ASU) **does keep track of publications and probably quantity of publications but also does your work, is it recognised in the media?** So, that is one metric of impact again, right? It is not that being in the media is so great in and of itself. No, it is more **like the media is one way to, one indicator that recognises something that is relevant other than to just ASU has happened**, right? Because if the local news is coming in and reporting and sharing the story abroad apparently that content is of interest, at least they **perceive to, to a broader audience**. (15)
* I think the **ASU’s done a good job or removing barriers and encouraging things and then inter-disciplinary research just happens**. It is not that you are told that you have to do it. It enco**urages students to take classes outside of their department.** (15)
* That is part of the reason that I appreciate the leadership in this school here, in (SIFIS?), **because all of that different disciplinary input is explicitly valued**. (17)
* **School of Life Sciences is a very broad school. We have everybody from basically human dimensions of biology, ecology, evolution, molecular and cellular biology, biotechnology, biomedicine – we are all under sort of one umbrella of life sciences.** And so, we do a very large diversity of work in the school. (21)
* I mean **it is very easy to be inter-disciplinary within the school. It is easy to be inter-disciplinary outside of the school. I think it is one of the things, I mean one of the real strengths of what ASU has done in the New American University has just lowered the barriers for interactions with people across disciplines.** And that is certainly within the school but even between schools, between units. The b**arrier for interaction is really very low if not non-existent.** I: And how has this been done? R: Well, I think it has been done mostly as a **mindset that we all are just at the administrative level, we are all cognisant that we need to support inter-disciplinary research, collaborations across units, teaching across units**. (21)
* And it is a great place because the **university encourages it** and when people, you know, they really try to make sure there are no walls or barriers to doing this type of research and the students just love it. (23)

**Science Education/Outreach**:

* What we also have is **a knowledge mobilisation impact award** (1)
* The project is called how **to end poverty in 90 minutes**. Every performance takes a thousand dollars cash, puts it on stage in a big glass globe and then the audience has 90 minutes to choose how to spend that money to fight poverty in their community. At the end of the time the money gets spent locally to fight poverty... That is a way for me that I connect the art I make to community dialogue and to change efforts (3)
* **The institution helps shape these values with that award**... I told them that I want you guys to all imagine 50 to 100 years from now, we may not be around. But all these fisheries in the entire world, coastal communities across the entire world where really, the majority of the global population is centred in coastal areas, and all these fisheries are going to be using solar fishing gear. They said that blew them away, they just reaffirmed to me, wow, **I really am in the right place**. I was talking to an audience that really knew very little about fishing and fisheries and I felt like the other contestants were talking about things that maybe would be more easily relatable, but I think that **they saw that and that innovativeness and they really appreciated it.** It definitely helped just to be nominated because I felt wow. (6)
* **Civic practice example** for when we use an artist would be we worked in Milwaukee, Wisconsin six or seven years ago. We were working with elders in the community who were homebound. They were poor and they were homebound for health reasons and socio-economic reasons. We discovered from those elders, one of the reasons they were trapped on their block was that the cross walks on their corner the light changes too fast for them to get across. We did not believe it at first but it turned out when we did interviews in nine different neighbourhoods, poor part, it is true, hundreds of people could not cross the street, could not get off their block and they tried and the city council just ignored, nothing changed. So **we created a civic practice project** we are working with them, we developed basically a performance grade that stops traffic. We have got data from times and we got a lot of public attention and we got politicians there and over the course of a couple of months it got such visibility and the message was so clear and the community dialogue became so clear that we got a bunch of the lights changed. So that was an example that was very specifically aimed at a specific change for a specific group of people based on a need they identified. (3)
* in our system, you know, from kindergarten through to high school so, through the 12th grade. So that **pipeline, that population of students we work very closely with the local schools, through programming**. I can give an example; so, one of our programs that is extracurricular is called ‘Epics’ - **E.P.I.C.S - Engineering projects in community servers.** And it is our, if you will, social entrepreneurship organisation for student teams, four, five, six students working on a design challenge okay? Where there is, if you will, some social responsibility compliment to it. That program is in the high schools. So, here is a way where we are able (00:10:26) to set up programs where I think young people today who choose engineering they really do want to make a difference. (20)
* These **programs are very important for giving them some exposure, an opportunity to practice and beginning to see, you know, is engineering really something I want to pursue? So, we are very embedded** and not just in high schools, even before. (20)
* We **have a graduate student program where graduate students go out into the schools in the Phoenix area and help teach science to grade school and high school**. We **have the ‘Night of the Open Door’ when the university is open, and we invite everybody in from the community to see what it is that we do, what it is we study.** One of the things that I work on is HIV prevention, HIV/Aids prevention and I have… Teach it when I am not being an administrator I teach a class on HIV and we bring in mostly people from the community to come in and talk to the students about what it is like to live everyday with HIV. (21)

**Transdisciplinary Research / Outreach**

* **Idea: team based-transdisciplinary phd-projects:** Students will go off into residencies where we send them out to government labs, government agencies, the private sector, to work as members of teams in these very different environments, emphasizing in those environments and on academic environments. So the students learn in a very practical sense how do they fit into those environments, how is this really creating an opportunity for me to have a different kind of career if I want to. Then we will work with them while they are there to get feedback from them to mentor them and then the end product will be this thesis that is in part a team bearing thesis, that is what we think of our cutting edge, walking a tight rope over broken glass kind of risky thing... they need to be able to understand the value and communicate the relevancies in these different industries or fields (1)
* we also do a lot of programming, a lot of **outreach** in the case of **humane cities** as a theme where we are thinking that that one is going to **involve more community engagement for instance** (2)
* I started heading up the medical humanities and so mine involves more clinical partnerships and community engagements so far, we will see where we go with that (2)
* We definitely have shifted in the direction of making it easier and easier for **people to think about the end value to society** and what that’s going to be and where it’s going. (4)
* The **Biodesign Institute** was definitely formulated originally, probably much more so originally than it is now, as **an outward looking organisation**... **President Crow** originally talked about the Biodesign Institute as what he called a **tightly coupled institute**, meaning that there were **a lot of people working towards common objectives.** And, when you do that of course, your objects are almost **always of a societal need** because that’s the only way you’ll get large sums of money, kind of run that off of an NSF grant or just a simple NSF grant, a single investigator grant... We were all going to work together towards common problems and common goals with at least part of the time. (4)
* The **Biodesign Institute** **values societally relevant problems**, and the attack of or **addressing of society relevant problems**. More than maybe just a chemistry department might or something like that, and in part because they have an environment where you can have in **the same group people from many different organisations, engineers and chemists and biologists** and what not. And, so typically inter disciplinary problems tend to be problems that have some draw from the outside, some external draw to them. (4)
* The marvellous thing about an institute like this is the **lack of disciplinary boundaries.** What you have to do with the pool of resources like this is actively push people and give them opportunities to do new things... my background is physical science. But the **opportunity to learn from people in chemistry, biochemistry and medical science is fantastic**. (5)
* **Flexibility and freedom**: ASU is a big school, they funded me on teaching assistantships and that was really good because then **I could do whatever research I wanted and I could have control**. **I could have autonomy and flexibility over my project**. A lot of PhD programmes, you go and the faculty person has funding and so you are essentially running their projects, which is fine but nobody was doing what I was doing in academia, so I knew that if I came here I had to do my own project. ASU is awesome about that too because they had no formal course requirements and I had already done a master’s, so I was like I do not really need to take a lot of classes. (6)
* So most of my advisees, but not all of them, **have spent summers or semesters away from campus in non-academic settings trying to cultivate these co-mentoring relationships**, and that has worked out spectacularly well. There have been joint publications. The students generally come back with a much better idea of the problems that they want to work on and the methods that are available to them. They have a better network of people available to open up career possibilities**. So we have sent them to government agencies, we have sent them to industrial organisations. I have yet to really have a lot of success with non-profit organisations, but in one case we sent them to small businesses, or a small business in particular**. So I would say these are generally people with PhDs or people who do research, but they are in non-academic settings (8)
* I had started a **new research centre** which was **again societally focused**. I had designed a centre which was designing, which continues to do that. I am still running the centre. The centre is **focused on designing technologies and devices for assisting individuals with disabilities**.**..** Blind and visually impaired individuals, or children with autism. Or elderly requiring assistance to be able to be more functional and independent. When Michael Crow came here I was taken by his vision because that is exactly what I was already doing. Working across disciplines, solving societal problems by which I was also advancing computer science to that next level. (9)
* I should be humble enough **to ask them what is it that they would want me to do?’ I had one focus group here**, which was post-secondary education students who were **blind and visually impaired**, and adults who are blind and visually impaired. And not only them. Their mobility instructors, their family members, their friends who work with them... **What are the daily life challenges that you wish, that if somebody was going to design some technological solutions that can empower you, that can enrich you, that can make you independent, that can make you productive members** that you want to be, what would that look like?’ So I therefore took all the focus **group inputs and designed four to five projects based on the inputs**. And then I said ‘**Who do I need to involve in order** to get these projects realised?’ It turned out it required all kinds of people. That is how the teams were assembled. (9)
* so you know roughly **social work, public administration, criminal justice**. We are interested in these populations and figuring out how to help them. And so we are here looking at this building, looking at these people, thinking what we can do... We put **two of our research centres, one on behavioural health policy and one on child welfare**, but the behavioural health policy one is the key. And we **created a clinic within that centre to serve the people who live in the building**. What was the/how did this all work? So what that did was it allowed us to do the following things. We reached an agreement with the owners of the building, the owners of the building by virtue of the fact that they agreed to have us in the building and have us operate the clinic, they gained **access to some federal tax credits which they only could get because we were providing services to the tenants**. We provide **services to the tenants by creating internships and other opportunities for our students to participate in the clinic and they learn while they are serving the people who live there**. And we are able to get funded research to examine and understand the benefits of doing these kinds of interventions. By virtue of our partnerships with the city and the state, **we are able to certify these services which makes them eligible for the tax credit. And because they are getting the tax credit the building charges us a dramatically reduced rent,** about a third of the market price. (10)
* And students did a **survey of the residents to find out what the needs were** and it turned out it was not a medical clinic, it was more of a sort of psycho-social services. (10)
* But I would **not necessarily say that in developing these products they first engage those publics and hear what those publics have to say.** Which I think is a really important part of what responsible research and innovation should be. And B **I do not think that there is a sense of asking sort of what/who we are responsible to.** (11)
* Is our approach to these communities in fact **what they want and what they deserve and what they are funding us to do**? I **do not think there is a reflection on that at all.** And maybe that is too high a level to expect but I think that **there is still very much an attitude of: we know what is best and then we will get it to them**... Which I think pervades the scientific practice throughout the US and probably throughout the world (11)
* **The Biodesign Institute represents itself as being a sort of/the jewel in the crown of ASU, representing president Crow’s vision for a new kind of innovation**, a new kind of sort of way of doing science and being very interdisciplinary and just being very on the cutting edge, right? **That is what they say about themselves. I am sure they are on the cutting edge of something but I would not say if you are looking through an RRI lens that they are on the cutting edge of that.** (11)
* **I do not think that they are particularly forward-pushing**. **There are people at other universities here in the US that are doing much more progressive things as far as transparency and research**, and **actual public engagement**. I think that U**niversity of Arizona has a citizens science sort of lab where people can come in and propose research and ask scientists to do particular things that their community needs**, which is a whole **different level of public engagement**, right? So/well I think that the bio/I am **sure they are doing wonderful cutting edge research but not I think through our lens**. I do not think their idea of what is cutting edge, what is pushing/the boundaries that need to be pushed are the same as ours. I just think that they are rather different. (11)
* So I think in bio-design and across the university **you are going to find a lot of diversity in views and so you are not going to find everybody on board**. Or even the majority of people on board with these sorts of very progressive ideas about what public engagement is in all of this. **But you will find a lot of people doing very interesting things in little pockets**. (11)
* So I do not think there is a lot of communication across the institution about these questions like public engagement. **Open access is/whatever we had we now have an open access policy, we have an open access policy because funders are demanding open access and the university needs to be able to make sure that they can fulfil what the grants require. That is why we have an open access policy. We do not have an open access policy because ASU is pushing open access**, so... my experience with open access? /it is just like **we are answering requirements from outside of the university.** (11)
* Critique of RRI: **responsible research and innovation is these five keys. Those five keys are wonderful but their connection to each other is not necessarily obvious.** (11)
* And so that is the answer I got across The Biodesign Institute, is that **you have to incentivise it in funding if you want people to do this**. If you want people to think about ethics more than just getting the IRB done then you/that has to be written/if you want people to engage publics before they do research, where is the funding institution that is forcing you to do that? (11)
* But they are like: can you/**it is great when you run workshops for us and do the public engagement activities for us** but then when I got into the actual conversations about that and about the effects of that/they loved the workshops, they were happy that it happened, **wonderful. But did you change your research based on that? No. Basically that still has nothing to do with our research**. (11)
* The challenge that I am tackling is **how can we be accessible to the community? Or how can we organise ourselves in a way that makes the product that we are creating useful, fundamentally useful to the people that we are saying that we serve.** And so it is a long process of course, just sort of **strategizing** what it is we have the capacity to do. (12)
* So in The School of Engineering the ... schools of engineering there are about **45 outreach programs for K through twelve** which is extraordinary given that it is not a college that is really focused on necessarily the community. But you have a lot of programs that are sup**plying their students with applied learning opportunities through community-based work**. (12)
* the **College of Health Solutions** who is partnering with the **Mayo Clinic**. And they are **working in public libraries** and **with the city parks and rec** and with a couple of other **community partners**; the **YMCA** which is a non-profit recreational complex... nice feedback loop. (12)
* President does have a **President’s Community Council**. (12)
* But where I think we will go next is having **community needs specific forums** with community members. So that a faculty member from different colleges who are working on the same community need and organisations in the community who are interested in the same community need can get in the same room and talk about what are the new challenges and what is the new research basically, to have those conversations. (12)
* So at the moment you **cross by those who raise their voices** and say: what do you have for us? (12)
* The institution has a **deep commitment to sustainability in all forms** okay? You know, f**rom the architecture of a new building to our research topic that might be say, about water**. And **one way the institution incentivises those activities is say providing sea grant funding. You know that is a very significant measure of responsible research and innovation**. Creating maybe a structure where some incentive is provided by partially funding some small project. Part of the incentive created by having a structure, an organisation if you will, where faculty can find partners to pursue research projects where again they are able to take advantage of their expertise. And the institution has stood up many of those things. (20)

**The New American University**

* There have been **several incarnations of the American University** from the Jeffersonian ideal of a rural, a pastoral, social finishing school for the elite. And this would be education in the classics, and kind of a small liberal arts, American, rural tradition. And that kind of got swept away with the Land Grant University that said ‘We want education in the practical and mechanical arts and the industrial revolution.’ And that morphed into the research driven university.
* The **new American University is meant to be a strategic and ambiguous challenge to the faculty**. What is the American University that we need for this **information age of highly complex problems**. They are **not reducible to the industrial revolution thinking anymore.** And I think that is enough. But it turned out that so many of the faculty were so deeply ensconced in this kind of... Bush vision of a research driven, largely federally funded, grant funded university, in the service of the industrial revolution in the military complex... So the **principles of the new American University are helping or are trying to take some of that ambiguity out of what the new American University means and allow people to interpret it with greater specificity**. (8)
* Three large initiatives - The **Biodesign Institute**, the **Global Security Initiative** and the **Global Institute of Sustainability**. (9)
* So that we might work on problem sets that are important for Arizona, that is also capable of attracting other kinds of investments... when I talked about the budget of the university and how we have taken responsibility, **in 2002 our operating budget of the university was $850 million. 45% of that budget was investments by the state. $400 million. This year our budget will be $3 billion**. (9)
* **We are the fastest growing research university in the United States. All universities included. So we have changed the speed as well as the impact**. (9)
* And the state investment is about $300 million of that budget. So **we have therefore raised money from other sources**. (9)

**Widening Participation - Online Education**

* He (Crow) re**ally saw the online education capabilities as being paramount** in this regard. How do you allow **accessibility**? How do **you allow people to get an education who might otherwise not be able to get it?** And, really saw that **moving online was very important**. That was hard. I mean, it’s not easy to do. There are lots of things that are very different culturally about online education and I think we’re really just starting in the sciences to begin to understand how to do that, and we’re nowhere near there yet. I think that the **arts and humanities were able to adapt much faster and mathematics** because if formats and the ways in which they could pull all that together were more straight forward. We’ve only recently, I think, come to grips with how to do online education and integrate physical laboratories. (4)
* We’ve found a way to do it. What we’ve basically done is we have created, **we’ve redone laboratories such that now instead of doing them for five hours a week, you do them eight hours a day for a period of time**. And, that way students can come here during their vacation effectively. From their work or wherever it is that they can’t, if they’re distance learners. **They only have to come here for a short period of time.**(4)
* **Online Education** - **We might be able to increase revenues but we do it at the expense of a diminishing product**... What is the cheapest way to get to 300 (students)? **You broadcast**. Do not build a lecture hall anymore. Just broadcast the professor. T**he quality of the interaction might go down even further**, but the temptation is ‘Oh it gets so cheap.’ **This is not the model of online education that is going to transform higher education**. But there is a different model. And that model is more like Facebook. It is subject to the network effect. It turns out that if all the students are connected to one another... (8)
* In this **peer-to-peer model, the more people who are in the class, the more valuable the class becomes**. So it is the Wikipedia model, and it can be really good as long as you set up the right protocols for interaction. We are not doing that in online education. We are still in a mental model of broadcast the instructor, and digital broadcast is cheaper than analogue, or real life broadcast. This is a medieval model of instruction and I do not think that most of the faculty realise it. (8)
* Now also the online education which is a significant investment. Because five years ago we did not have much revenues from online. This **year we have 30,000 students enrolled in courses and programmes, and another 400,000 students enrolled in our Global Freshman Academy**. (9)
* I think we certainly **take a lot of responsibility for the physical community or the community in which we physically reside. But we absolutely consider the global community our responsibility.** And I think we endeavour to engage with ideas and initiatives that benefit the global community. So an example came out of this office, **which is our MasterCard Scholars Foundation**. This is a **program that invites sub-Saharan African students**, college students, to finish their degree at ASU, go on to get a masters and then **return to their home country**. In that time they went home and had an internship that we arranged for them and so that they **have this network and a greater likelihood of getting a job after their degree**. And so the entire **purpose of that was to build up other communities** and I think that is very much an interest of ours, is how to build up other communities that are/have nothing to do with Phoenix. (12)
* Another **initiative is our Global Freshman Academy**. This is a program that really centres around **our mission to increase accessibility to pathways**, more **pathways to higher education**. And the **program allows anybody who has an interest in learning all over the world to take freshman level courses and not have to pay for the course until they have passed**. And so the idea is to remove this barrier of risking a lot of money when you do not even know you have what it takes to pass a college course. And so the idea then is to increase pathways to higher education that/for somebody that is never going to work in Arizona, that has nothing to do with Arizona. But that would be our/we feel it is our responsibility to make this easy for them. (12)

**Cooperation with Mayo Clinic:**

* I have developed a partnership with mayo clinic. Mayo clinic is large and historic medical institution (2)
* President Grove is working with mayo clinic to help them create a medical school here which launches here, it is small, it is an innovative medical school where they do some of their training at mayo and some of the training at ASU. So because we have that kind of clinical partnership already in place it seems like the obvious place to go to start working in something called health humanities and it turned out that there is a centre at mayo clinic in Arizona and it is ... centre for humanities and medicine so I made contact with their co-ordinator and we started working together (2)
* The first job was really to bring some faculty together here at ASU to go out to mayo clinic and just talk about the research and try to bridge that divide between university research and the clinic so we brought some faculty... We also brought an interdisciplinary group that is doing work in the community doing diabetes prevention with middle schoolers; it is a theatre historian from the Herberger, a theatre practitioner, one who specialises in youth theatre and a social worker from transporter studies. (2)
* So we did a panel presentation that involved ASU faculty working mainly in humanics and social sciences and then physicians and researchers for mayo talking about what resilience meant to them, what were the limitations of the concept, how it was useful in working with patients and how it was not useful and with communities... In the third year we started working on programming together which has really been satisfying, they have a large conference once a year called humanities in medicine symposium and we had two hours on their program. (2)
* now that they have the medical school they have become more interested in us, in what we do and I was invited just three or four weeks ago, maybe a month ago. The faculty member who runs the residency program in anaesthesiology and is also, I think, director of the residency program overall, invited me to come in and she said "Come in and just do humanities with the residents" so I said okay and I said "Do you have a goal or a syllabus?" and she said "Well, we think we are going to sort of throw some humanities at them and see what sticks" (2)
* Provost Betty Capaldi asked me to help her with another initiative that was a more personal initiative for her, which was **obesity solutions**. This was something that was in her area of interest that she really wanted to get started **with the Mayo Clinics**, she brought in a Mayo Clinic partner and then asked me to be the sort of ASU operational person so I set that up. (13)

**Ethics:**

* **Ethical/Integrity training**; When you first join a research lab you have to take face to face training and it is an hour or two class and then we have what is called refresher training every year (1)

**Science Education/Outreach**

* Biology **Website to provide outreach educational material to K12**, kindergarten through 12th grade students, as well as just the general public (1)
* **"Ask a biologist"** - kids or anybody can write in with a question about biology and then it gets forwarded to somebody who knows that field, I have answered questions on it (1)

**Gender**

* And in Gender? **we just deal with because there is Title IX which is a US law about discrimination, right? So you have a whole office that deals with all of this** stuff. B**ut again that is a response to US legislation from the 70’s. And that keeps on evolving and it has had stuff added to it every single year**. It is a very sort of live conversation in the US. And so in the **broader context of the US I think there is a lot being done about/in response to gender stuff. But I do not think that necessarily at ASU there is a whole lot of innovative ways to think about that**, right? Because yes, we are dealing with a lot of/there is a lot of sexual harassment, there is a lot of stuff like that. **But I think that gender and culture here is certainly largely dealt with on the level of sexual violence and breaking the law. Which is just the tip of the iceberg if you ask me,** **if we are talking about inclusion of women or leadership of women in science, in the scientific establishment, right? Then there has to be a little bit more of a culture shift** ... You would have to go into the lab and look at what the dynamics are and look at what is happening. Because Title IX violations do not include women feeling like they are invited to speak up until they are asked their opinion and maybe they are never asked their opinion. ., and things like that which I have heard talked about in my various interviews, that there is**/there are dynamics that do not break the law but that are huge cultural issues that continue to exist**. (11)
* But here also in the university more broadly **you are going to find that only in people that are doing gender women studies and they will have the very cutting edge progressive understandings of it. But does that go back and change the university culture? No it does not**. (11)

**Section 3 - Systemic consolidation**

**Interdisciplinary Research / Impact orientation**

* many **academic units** already ha**ve interdisciplinary research embedded into their curriculum**, how heavily they follow through with identifying it as interdisciplinary research varies from different academic units (1)
* The **Herberger school of design**, which is architects and design, they have a very, very great team-oriented training model where they put teams of designers together who work in different areas of design work with materials or whatever and a few years ago they wanted to do **biologically inspired design**. So when I was the director of life sciences I paid TA's for a couple of biology graduate PhD students to go be on the design teams to work with people in design. We started a program on art inspired by biology that has now been running for several years and next week they have an opening at a gallery down town. That is one of their **first major exhibitions** (1)
* **Interdisciplinary Science Building**: In my building there are people from chemistry, there are people from physics, there are people from bioengineering and there are people from life sciences, and that is the whole point of the building. The labs are big, they are open, there are six faculties in the big lab where I have my lab and it is very open (1)
* And we have this beau**tiful new space for the institute, it is a sign of that kind of institutional commitment**, also the hard work of the previous director and all of us (2)
* increasingly interdisciplinary teams so ASU has these ready teams and are **putting together these folks that have never worked together** to try to address grant challenges (3)
* I think generally that we have become **more interdisciplinary**. We **have to design new validation structures** and in the meantime, I think **it requires deans to be as nimble as possible in trying to identify the sources of validation and recruit the right peop**le, the right letters and make the right arguments as you pass that case up the line.(3)
* This is some **kind of thinking, which one needs to just grow among faculty and amongst students as well**. Like anything else that grows **you have to water it and put it in fertiliser**. a lot of it happened at the student level. I think students are a good venue for many things. They are a good venue for doing interdisciplinary research, you start getting them to think that way and then they pull you in and they’re also **a good venue for interacting because they’re open to these questions**. They **like to ask those questions. It’s not threatening to them because they have got nothing at stake**... **They have not spent 10 years developing X, Y or Z, so if somebody were to decide that X, Y and Z isn’t as it currently exists entirely ethical, then that’s not so much of a problem for them.** Whereas, it’s a little bit more difficult for a faculty member. (4)
* I bring all these students together and they are all **co-located in what we call the studio.** It is not a lab but so there it is a lot of **opportunity for informal knowledge sharing among them**. And so now we have English and communication and design and engineering, certainly, and sustainability. And all of these students are in sufficient proximity or working on similar…or related if not the same projects…that we can create a peer-to-peer mentoring network. **That is extremely ambitious in its reach throughout the university**. (8)
* **Boundary objects**: One of my former PhD advisees, she graduated in May, she was the one who came through the **Herberger School of Design**. Her name is Doctor Camilla Jenson now. And we had a grant from the National Science Foundation to use **Lego Serious Play as a facilitation method to teach undergraduates about nanotechnology**. The idea here is that nanotechnology has all these multi-faceted aspects. In particular we are interested in the social and ethical aspects... So we get to do things using the boundary objects. **But literally they become the way that people communicate through a physical metaphor, rather than having to understand the technical words in the jargon**. The idea here was that we can go a lot faster to creative contributions and empathetic understanding if we are using the boundary objects to facilitate that. (8)
* A cult**ure shift can happen when you set your values straight and you adhere to those values**, and you follow through with the values that you have set. If you say one thing and do something else, people will not change. (9)
* If the **top-down is also not working, it will never change fast enough**. So here **we have taken an effort to apply the top-down where necessary**. **Now our faculty are much more** because of the fact that I said to you…the new culture that is there in the institution, **we do not have to intervene much at all, because faculty are naturally inclined to appreciate, acknowledge, and reward, and recognise people who work across disciplines**. It has become more a part of the culture of the university. (9)
* Of course **new people come in because they look at these values and they are attracted to the values.** Then you do one more thing**. You invest in promoting those values**. But if you actually consciously invest…by investment it is not only money…investing in all forms of things. Like time, energy, whatever resources that you have. **If you are able to invest, then the culture shift can happen with new people and with the people that are already in the system**. It is about **matching the right person to the right culture and the right values, and the right environment.** That is all it is. (9)
* There were more fluctuations, there was change in leadership. Leadership which believed in these set of core values. The design aspirations**. And when deans and chairs believe in that, and the administration believes in that, then that slowly starts to seep down into the culture of the institution**. (9)
* It is **really hard to tell any faculty member you should work on this project and not on that project. We generally leave it up to faculty to decide what they want to work on but what we can do is provide increased support for programs that fit better in the mission of ASU and that is use inspired research**. And so, that is prima**rily the way we do it is use a carrot rather than a stick if you will**, that the terminology we use. That we provide the incentives but if faculty do not want to do that there is not much that we have chosen to do. (21)

**Outreach / social embeddedness**

* **Quality Management – Survey**: So the **purpose of this surve**y is to **capture the extent to which we have made good on this promise to be fundamentally responsible**. And unlike other institutions **we do not have one office of community engagement**. Many other universities do sort of centralise all the efforts that are socially engaged. But at ASU it is/because it is a fundamental part of our charter and fundamental part of our design every single college and unit is responsible for this mandate, and for embracing it and interpreting it. (12)
* Definition:It is **not just volunteer work such as community service, it is socially embedded and socially focused research**. (12)
* We have **disparate activities happening in different colleges** that address similar community needs. (12)
* We **have not done a formal inventory** or formal **survey of community members but I think it is a logical next step to survey their** interests and match it up with what we think we are doing. But we are not there yet I would say. (12)

**Values / Culture:**

* Basic methodologies can be really critical for driving these conversations when we are dealing with things like sexual violence **we want it to be the centre of how the campus engages those conversations** so **not just regulatory and policy driven but driven by cultural shift.** We would like to have eventually an **artist embedded in every other college** of the university. (3)
* That’s a **different culture** than we are the chemistry department and we all go on Friday afternoon to the chemistry seminar, and we all do this and we all do that. **There’s less allegiance to that when you’re asking them to also do all these other things. It’s human nature**. So, what I try to do is convince my colleagues that **we have to embrace that culture and work with it, but it is difficult for some of them.** Some of them don’t like that culture, it’s not a culture they’re very fond of. (4)
* You **still have to be excellent in your classical** **field** and your classical discipline, but you have to do as well a lot of other things. (4)
* I think there is very much a **sense of shared mission in this school** and that **reflects in part the very clear communication of mission from the top of this university.** The **values of this university are very, very clear**. You get **rewarded if you align with them, you basically get cut/so if you do not wish to align with them that is fine, but there will be no investment but you are basically on your own**. (13)
* **Hiring**: But it is/I think **the faculty did a really good job in assessing whether someone would be able to intellectually connect in some way to the core**... so **the core was a value and then adding the people around** has also been of value to maintaining that culture of respect. (13)
* **Hiring/Keeping people:** We have had very **good luck with keeping people here.** So we now have our rising full professors of people that came in right at the beginning of their career. So we have had good luck keeping people as they rise up through the ranks, so we do not have a lot of/so **those people feel very committed to the future of the school. Very, very committed**. (13)
* **People really felt valued by the administration** (13)
* But if you **create an environment in which there are lots of examples they can draw on it I think that is really helpful.** So sometimes people actually are doing use-inspired research but they do not really understand they are. So it is also helping people articulate what they are doing and the relevance of what they are doing. (13)
* **Hiring**: We are probably **not going to be hiring people with degrees in sustainability, rather we have hired people who study politics and economics and maybe some historians and maybe some engineers and we, all of these people are interested in sustainability** we will put them together and let them see what they have come up with... (15)
* **Hiring: In the humanities it is very difficult to get people to change their ways and cramming them into a new unit is not going to make an individual researcher change what she thinks about her research**. **What we need is to make great hires of people who think across disciplines** and there the schools are going to make sense because they are not going to be limited by, “I am a history professor and I am going to be judged only on the basis of narrowly judged historical research”. (16)
* **Hiring: They have hired these really, really smart people who think more broadly about what they do**... willing to think beyond the box (16)
* I think that is what it does, is the **ASU design aspirations and Charter** and vision **is going to make it more possible for more people to operate in this kind of new engaging space.** That was the case in my situation because I was in political science and political science is probably one of the more traditional disciplines that has not changed a lot because of the new American university and does not necessarily want to, does not see the need so much... It makes a **difference then to enable some people to be entrepreneurial and self-starting without I think, and this is just my experience, without you know stigmatising people who do not want to adopt the ASU model but still want to do good work**. (19)
* There is **also an awareness that you are in a community or a series of communities and that your work should have some value to society**. And so, that is another way in which, it is not so much a direct incentive although these people do have, you know, they get some money for this recognition, but it is more that it is an institution that shows, **it demonstrates that it is valuing these ideas and encouraging these ideas**. (19)
* **Hiring**: No, I will just say it. **I think as with any transformation partly it happens as older faculty leave, and newer faculty come in. As an administrator I have been involved in hiring newer faculty and they fit into this idea of the New American University really well and really easily.** It is sort of second nature to them. Where it has been, you know, they are, they just assume that the work they do is going to have some impact on society and many of us older faculty have had a bit more difficult of a time adjusting to these ideas. And so, I think as we bring new **faculty in and especially as we, you know, it is not just bringing new faculty in. Part of the selection process is finding people who think this way.** I think that will allow the transformation to happen more easily and I say that as one of the older faculty who is in the department in the school. (21)

**Inclusion / Structures / Change:**

* So the charter is deeply embedded in the culture and somehow academics like to resist it all and so universities do not change that much. **Over this president just got through that resistance** and people did not...he won, he basically **won against the sculptures**, they could not...he was so dynamic, he was so successful, he was so good at getting resources (3)
* **He destroyed departments and recombined them in ways that I do not think compared to any other universities**. I am not sure exactly how, it must have been a weak factoring governance to allow change to happen. (3)
* Then **people came who were excited about the idea of being in a space** where they were going to **be challenged to think differently**, they were going to be challenged to explore alternate ways to learn and embrace technology. (3)
* So if you look at the nu**mber of Native American students that we produce, we are the largest. Number of Hispanic students that we produce, one of the largest.** If you slice and dice it…but we did not go about it by saying ‘Let us make sure that we are the largest.’ That is not the way that we work. **Let us embrace diversity by giving everybody a chance, who is qualified, who has the aspiration to want to go to a university education**. Give them a chance. **Give them the environment that allows them to succeed. Give them the tools**. If it is financial need, give them the financial ability to be able to go to school. So if you do all of that, then you are going to embrace people from all quarters. (9)
* I do not make decisions, **I pass them to my dean, my dean takes them to Provost and the Provost makes a decision. We do not have real autonomy in terms of the hiring or anything** like that. (13)
* We do **not have a very top-down strong legislative bureaucratic structure like Europeans** do and we do not have a sort of agreed upon framework **like the Brits do. But yet we have a lot action and activity... It’s like bottom-up, find out how you can transform yourself in a way that works towards this aspiration** but does not cost you more. (14)
* So I like that approach. Of course there are limitations that can be critiqued but it is better I think **than just having the five keys be the be all-end all**. (14)
* more of a **bottom-up approach**, mo**re unique and involving self-discovery by the bodies that are contributing but keeping their eyes on the actual choices and activities of research and innovation**. This is maybe a distinguishing feature in the US. (14)
* **But it was all decentralised** (14)
* We **do I think a pretty good job of customising a faculty member’s work load assignment.** Their assignment such that you can really play to their strengths. So, **if somebody is a fantastic teacher and can really make a much broader impact then they can through some research engagement. They may have a greater obligation in their workload assignment for teaching than research**. So, we definitely are sensitive to that. (20)
* the **institution has metrics associated with, total enrolment, level of research funding, size of the faculty, the fraction of students that we retain year to year, the level of engagement we have with corporate partners**. (20)

**Section 4 - Vertical multi-level alignment**

**Interdisciplinary Graduate Program:**

* I was always **concerned** about **PhD programs being affiliated** with what we call **academic silos/academic units** at the time because the financing flows through the academic units and interdisciplinary programs at Ohio state largely failed because they did not have access to these financial resources that the academic units do (1)
* We still have a **19th century model for training and academics**. Single venture, single student, student does their own work and they publish a PhD thesis at the end of it. And I say that as 19th century because **it is not the way almost any kind of academic endeavour takes place in the 21st century**. I have six grants every one of them is a **team driven grant** (1)
* Parts of the grants you apply for require that you have a **section of the grant called broader outreach**. **How are you going to communicate this to the public**? A lot of scientist do not take it seriously but I have reviewed grants for NSF and if you do not have a good, broader outreach your grant will not get funded regardless of the quality of the science. (1)
* **Interdisciplinary programs** at other places often fail because they don't have **access to these financial resources** that the academic units do. **Conventional financial structures can hamper the evolution of more interdisciplinary** programs (1)

**Cooperation with Mayo Clinic:**

* the next step for us is to look into possibilities for doing some kind of larger grant, some kind of institutional collaborative grant. We have not gotten there yet, at this stage **I think it is a culture shift that we have achieved** which is not nothing, it is a big thing actually for us... in both institutions. Certainly, at mayo clinic because, as I said, they were really thinking more in terms of arts than history and literature. And also here because the faculty actually now see themselves as part of this interdisciplinary field and lots of faculty who come to me and to other faculty who are involved and say I have heard there are a lot of people working in this field, I would like to collaborate on this project so we have become sort of a locus for people working in that field which is wonderful (2)

**Problems with Interdisciplinary / Transdisciplinary Studies:**

* The other thing that we have had as an outcome at ASU is that we are about launch next year a **health humanity certificate at the undergraduate level** and we have at least 30 faculty who are pretty involved and interested in getting them online. It is going to be offered both at the ... campus and also at West or West campus, so that is a new thing and we have had a lot of student interest in it because what we are experiencing and I know this is partly a global phenomenon but it is intense in the United States, we are seeing majors in humanities are dropping but minors are increasing. So a lot of students whose parents are pressuring them to get a degree in a professional field but who are really interested in the humanities. So, for instance, they are pre-med but they also want to be a history major ... so **this certificate we are hoping will encourage them to take stand in a substantial humanities coursework as they pursue a professional degree**. Whether or not they are going to be going into those professional schools is not clear but whatever the case we are hoping that it will encourage them to come into humanities departments and work with humanities faculty on these questions. (2)
* The **barriers that exist are still within the humanities units**, there are still **fairly traditional promotional ten-year requirements** that sometimes do not value this kind of work or they do not know how to count it and the metrics are not there. What I say to new faculty that want to be involved in our programs is I say we would love to have you and it will enhance your research but be careful that you can also meet the ten-year requirements of the unit that you are in. **Another barrier is also that I do feel that sometimes that larger mission of the university does not get completely filtered down to the faculty. It sort of gets stuck at the middle level** because I am someone who has not been an administrator for very long and I am very much in the middle administration. I can see that as a faculty member just recently I did not embrace this kind of work as much as I could have if I had understood how strong the institution was ready, how strongly the institution wanted to support that kind of work. I think that sometimes that the messaging has to be...we have to figure out a way to help the faculty embrace this kind of collaborative engaged humanities research without telling them that we are going to change what they are interested in and what they are committed to because I think that is wrong and dangerous. But **telling them that we are interested in trying to connect them to other people who have the same kinds of interests, we would like to try to support them both in terms of developing community but also in terms of pursuing external funding.** Thinking about how they might be able to disseminate the results of their research in ways that they have not thought of before so that is what I think. So I do think that ASU is a unique context (2).
* We have very little good research about what happens in these spaces of collaboration, when it works and when it does not. We need more of that... there has been **evaluation research from a funders standpoint** but that research tends to be really about outputs, inputs and outputs, it is **not so much about what is actually happening**. (3)
* at a loss of sense of community in some places and a gain of sense of community in other places. So**, one thing that I think people in this unit find disturbing**, is the **fact that we’re now spread out all over the place.** And, so **you lose a sense of identity when that happens**. **We’re in six buildings across campus and people are associated with other things.** They’re associated with the Biodesign Institute, they’re associated with the Global Institute of Sustainability, and they’re associated with the Biophysics centre or whatever. **They are often joined between different departments and different units and so their allegiances are spread in many different ways**. And, **so it becomes much more difficult to get the sort of esprit de corps that you would get if you had a chemistry department sitting in a building where we all went to the same seminar** and we all did the same thing. That’s not the way it works and frankly, I don’t see how it will ever work that way again. I don’t think that’s the way we’re going to be in the future. So, **we need to embrace this new approach**, which is truly everybody having many different allegiances and many different things that they’re involved with... **it's a different cultural model.** (4)
* Problem with evaluating interdisciplinary research - I would say, there’s always been a bit of an **academic bias towards individualism** and so **when people come up for tenure, there is a tendency to say, did you do this yourself?** Is that grant the one you were the PI on, not somebody else and you’re working with them? I think **we are moving more and more towards and understanding that teams are very importan**t, and people, we can value people that work well in teams and not necessarily as the leader. But, **that is a slow cultural shift in academics.** Academics tends to value at least, certainly the sciences, tends to value, to be very blunt, the alpha male concept of the scientist. (4)
* **Fundamental Research and societal needs**? Actually as soon as you start to look at any of these major problems, you almost immediately find that we’re lacking fundamental knowledge. And, so **there’s plenty of room for that fundamental science to take place**. It’s maybe a little **more directed in the sense that it’s in the context of one of these other problems**, but it’s still very fundamental... Take aspects of the immune system, there’s so much we don’t know about how the immune system works, that doing fundamental research on the immune system is almost certainly going to push that area forward. So, I wouldn’t worry that fundamental research will go away, but I do understand that professors and people say this all the time, **I became a professor because I didn’t want someone to tell me what to do**. I wa**nted to be able to be creative and simply think about things and find new, creative ways to attack problems.** People want a certain amount of freedom and that **you put them into a box to some extent, as soon as you define the goal** and so this mix has to be maintained somehow. I think we have to encourage both. (4)
* I think though, that **you always have a certain number of faculty that don’t even want to be constrained that much**, and I don’t have a problem with that **as long as there’s a balance**. I think t**here’s room for people that want to have a couple of NSF grants and study some very interesting chemistry or biology or something, physics, that really, we don’t know what we use it for. I just don’t expect that that’s going to be 100% anymore.** That’s I think to be determined by us and by society together. Trying to understand what the benefit is because I think there is a huge benefit to society to simply have a certain amount of work being done, trying to understand why the world works the way it does. (4)
* It **has to grow organically** because like I said, **if you do talk down too much, then you’ll get some real resistance there. People will feel like you’re trying to judge them.** If you **do it right, you have interesting discussions**. So, we’ve had a number of different, very interesting interactions on subjects of biomedicine, gene drives, and these kinds of things. **Where clearly getting the view from society is ultimately going to help scientists** because you have to decide how you’re going to roll these things out in ways that society won’t push back against. (4)
* **Theory vs practics**: int**er-disciplinary is really easy to say but it is really, really hard to do.** And what I mean by patience is, for **true inter-disciplinarity to happen there has to be a deliberate continued engagement between people**. Because a lot of the times what I have seen with inter-disciplinary projects is, you will have like a computer science project and then you will latch on a social scientist, or there will be like a social science project and you will latch on a computer scientist, or something like this. But **to truly have the continuous engagement I think it is incredibly important for people to continuously have a conversation**, first to **just understand what people mean by different terms, a common language**. (7)
* I would say that the **best way to engage undergraduates in inter-disciplinarity is through inter-disciplinary undergraduate research projects** **while ensuring that they are also getting** **sufficient depth in whatever discipline they are building**. Because it is hard to be inter-disciplinary if you do not have a discipline. Right? That is I think the other challenge with inter-disciplinarity, like sometimes people just are like, oh, well, we just will not go deep on anything. But that is not actually how inter-disciplinarity works. It is actually, you go deep on multiple things and are able to make changes at another level because the Humanist has the depth in Humanities, and the Computer Scientist has the depth in Computer Science. (7)
* **We have done things here in very non-traditional ways while respecting a lot of the traditional frameworks**. (7)
* The filter of the **ISI web of science is retrospective and conservative**. It is **anything but forward looking**, because they are incapable of anticipating what the next high impact field would be. (8)
* Many **places do engage these days, in interdisciplinary research**. But if you talk to them, some of them will tell you that **still the tenure promotion as one example, policies and processes value people being strong in their disciplines**. If **they do not account for the people going out and working across disciplines as part of the criteria of evaluating their progress and their contributions, then you will find it hard pressed to motivate people to want to engage**. Even if they have the desire to do that, it is hard for them to motivate themselves if that does not count for their progress, and how they are seen and recognised by the institution. We have taken the approach of recognising the interdisciplinary, transdisciplinary contributions as mainstream as disciplinary contributions. (9)
* Problem of evaluation of interdisciplinary research: There is definitely a tension... we want you to be the top notch scholar in the traditional sense, we want you to publish on all the top journals, we want you to do x, y, and z. But we also want you to be applied... We have not gone to the point where we are saying: oh, well you can get promoted to full professor, even if you do not have the same publication record or whatever, **if you have shown/if you have demonstrated this impact in the community**. I am not against that, I actually like that idea. But **we have not evolved to that point of view and there are challenges in evolving to that point of view because once you start offering a standard that is quite different than other universities there is a tension**. Can the person go from your university to another university, does your school lose respect of peers? Which is problematic for a whole bunch of reasons. So there is a tension. **There are ways through the tension because often these applied projects you are getting externally funded, you are getting external funding to support that. And that is a mark of academic excellence and rigor**, so that does count. So there are bridges that overcome this divide, but I think you are right to identify it. (10)
* But **it requires an adaptation**. And of course some people have a very traditional view like: no, it has to be this. And we have this tension embedded within the university because we say: **well we want to have the same standards as the best universities when it comes to promotion and tenure, but the best universities are using a very traditional standard. So then how do you do both of those things at the same time**? Not so easy. (10)
* **Barriers** to our work – **Outreach** **- So just our size I think is a challenge and the broadness with which we define our engagement**. We also include in that definition economic development, so all of the ways in which we are stimulating local economies... Trying to **capture all of that under one umbrella is very ambitious**. (12)
* So we are in a pol**itical environment where congress is trying to cut funding to social scientists.** Where governance of states are saying: **we do not need any more anthropologists.**.. It **really, really makes me mad because if anthropology, sociology and these other disciplines do not explain to the public in a real and tangible way how they are contributing to society** in ways that matter. (13)
* So, in the United States the **economy of academic humanistic research is largely conducted through publishing papers and academic journals, publishing academic books with a small number of approved publishers and largely speaking to other academics within your own sub field**. And the president is certainly not dismissive of that and ASU is not dismissive of that. So, the balancing act I have had is to support and promote and praise faculty who are doing traditional humanistic scholarship which is absolutely critical. It is a kind of basic science research in the humanities, very in depth, non-use-oriented research and it provides the grounding for the intellectual work that most of our humanities faculty can do. **But also,** to advance… Applied research is probably not quite the right **way of putting it, but more use inspired research where we are connecting the depth of understanding of human culture to goal oriented research. So, large projects we were talking about at the very beginning – sustainability, energy, water, security. Large sort of, large initiatives which ASU has put forward** and they are largely thought of as science and technology and to some extent because of president Crow’s own orientation – very policy oriented here. (16)
* The expectations for promotion within your own field, within your own academic unit run counter to all of what I was just saying and trying to promote. So, the way a faculty member can generally succeed is by coming in, keeping your head down, publishing books and articles and getting tenure. And then, you know, you think okay you have got tenure now you can go on and be creative – no, you need to make it to full professor and the way to do it is to write another book and to write some articles. And that **I cannot single-handedly change that because our tenure and promotion processes are very largely driven by peer evaluation of the value of somebody’s work both internally and then external experts in the sub field of outside**. (16)
* These **organisations are inherently very conservative in terms of the humanities and arts about what counts, and I cannot rewrite the rules**. Okay, your book does not count, this person’s research grant where she or the collaboration with the dancer does count (16)
* One of the big **challenges in academia is that the way that we are rewarded at**, you know, **by universities** and by, you know, **the field of academia is by contributions in our narrow discipline,** right? So, yes that continues to be, because people come, people continue to come home and re-ground in their discipline and want to be able to think, have been trained to think and to frame according to their discipline. And not only their disciplinary language but their **disciplinary values, their ethical codes of their discipline which, you know, are there are many similarities between different disciplinary and professional ethical codes when they exist. But, they are not always the same**, so yes, that is a real challenge. It is a real challenge. (17)
* The **biggest challenge I think is in the review panels**, right? Because **review panels are made up of academics who are trained to be disciplinarians**. So, it is, that is a little bit of a struggle. When I sit on review panels I have seen over the past five years that we are just starting to inch into respecting inter-disciplinary methods. The fear that panellists have is, “Oh**, I do not know how this method works so I cannot evaluate the, you know, the integrity of this proposal**”. So, that is a challenge I think for grant bodies to, you know, compose panels who really can, you know, that you can have an expert in this, you know, discipline and an expert in this discipline and that they both trust one another’s expertise and one another’s judgment of the methods of a proposal so that they both are going to, you know, be able to incorporate the other’s expertise to come up with a single, you know, mark. I think that is a real challenge. (17)
* **Interdisciplinary teaching**: So, st**udents in an inter-disciplinary environment are taxed with having to learn the culture of all of these different languages which is a tax**, it really is. It is do-able but it, you know, being able to sort of pop in and pop out of a PhD program in an inter-disciplinary sort of space like this is very different... you have to go **through that embedding process multiple times** in order to really be part of these multiple fields which is what you have to do... **learn the different codes of disciplines** (17)
* I think there are still **institutional barriers to recognising the academic value of things like actually having an effect in the real world**, right? Like if a city changes their policy related to autonomous vehicles and is better able to achieve their sustainability objectives that probab/, that is great, but it probably does not count as much as an article on theorising, you know, how cities adapt to autonomous vehicles. (18)

**Differences between applied research and fundamental/impact oriented research**

* **Basic sciences are stamped with a lot of convention. One of the problems you have in basic science is the research are prioritised by the community**... . In **applied science**, it goes back to my **thing about the market**. The market will decide and so I am actually most pleased with output of the lab that has been commercialised or resulted in the spi**n off company. That to me, is a good objective measure of having impact**... That doesn’t mean it is wrong or bad at all, it just means that the **room for innovation is much more open in applied sciences**. (5)
* **Interdisciplinary research vs specialisation of knowledge**: Specialisation of intellectual labour. What could be more efficient than this? **But I think that age is over. The more disciplined we are, the more we miss**. Because we are now in an age of connectivity in this sort of wayward age. (8)
* There used to be **in large universities, there would be a law library, and then there would be the humanities library and there would be the engineering library**. And why would you ever leave your own library? **Nobody does that anymore. Everybody goes to** (taps fingers on table) s**cholar.google or whatever** their favourite indexing is. And we are wayward. I will leave engineering if there is knowledge in the school of business. I am much less disciplined, and **that is a threat to the bureaucratic structures that are asking for that discipline**. (8)
* **Path dependency:** I do not necessarily think that the way that science is understood in society which I think is the core thing here is necessarily **something that we can change by talking to a 60 year old scientist who is very set in his ways and already has his lab and everything**. (11)
* **Problem with RRI mission**: **you are challenging my ability to make decisions about what my research is and nobody wants to deal with that**. (11)

**Organizational Change**

* ASU was a **university that already was growing very rapidly**. It already had a **lot of growth potential** and a lot of poten**tial for other kinds of things**, and there were many things happening even at that time that had to do **with interactions between different groups** in the university. It was a **much more collaborative place than many universities** are. I think that if you ask President Crow, he will tell you one of the reasons he came here ... because he was an advisor to the university and to the provost at the time. He befriended the provost at the time, who brought him in as an advisor to the university. (4)
* One was that he, at that time, I won’t say it was completely the **Wild West**, but it was a muc**h more open venue than many of the more established schools were, in terms of flexibility to try things** and what not, and that was true before he came. And, it was much more **open to broad collaboration across colleges and units** and what not, than many universities were... it once was a **blank canvas,** but it **offered a lot of opportunity for change** and for trying things that were very new and very different that, let’s say, Harvard, or a **very well-established university**, which might have been easier in certain respects to get things, certain kinds of things going (4)
* I think he liked ASU because **he (Crow) had a lot of freedom** here to try new things that he might not have been able to try in other places. So, that maybe is where it started, it had a lot of freedom. **It didn’t have much of any strategy** and that was really, I think, what we lacked at that time, was any kind of real strategic vision of where we were going and what we were doing. (4)
* the **state** had just **decided to put a lot of money in education...** they also wrote into it some **money for the universities** specifically to get them to start **looking outward** and this is the so called TRIF Funds that financed a lot of the early work that President Crow did. And, **those funds came with a lot of flexibility in them.** (4)
* There **has never been a year that hasn’t been better than the previous year**. I don’t mean just because I have been very productive, I mean because the **environment has always been improving**. That may be a very negative comment on Arizona in the early 1980s, but the place has been a tremendous place for growth, and a wonderfully challenging environment, independent of anything else. (5)
* **The university system in Arizona had largely been neglected**. Unlike California, which kept adding new campuses, the university system in Arizona remained at 3 universities. University of Arizona, the land grant, ASU, and Northern Arizona University. **Now there are community colleges but the university systems had since been capped**. The university of Arizona made a strategic decision, long before Crow got here, that they had reached the size that they want to be... He said ‘Here is what we are going to do. We are going to **open up new campuses**. We are **going to open up new seats**. We are going to **grow the undergraduate population to serve our in-state**…’ Okay we still have not caught up relative to other schools, that the state of Arizona is still underserved. (8)
* **He did two things - increased the size of the undergraduate population and increased tuition** because the tuition rate at ASU was very low. When you layer those two things you get an **exponential increase in revenues**. The exponential growth in revenues **has created opportunity for lots of these strategic investments that improve the quality** and deliver on the promise of the increased price. (8)
* So we have done a good job of **positioning ASU as a famous school that offers an international degree to rich students in the Middle East who want to study engineering**, because that what the government support is available for, but cannot get into more exclusive schools... we provide an opportunity for them to get an education. I am just saying that the way that they pay for that education, they are in our class and paying for it in a way that makes it cheaper for other students. **We have a transfer of wealth in this new model.** (8)
* Point is **we live in a metro area where we should have, as a college of engineering, a similar effect on the local economy here** and the local economy of life **frankly as those other colleges have in those other metropolitan areas. How do you do that? Well you have to grow, you have to bring your students here, you have to produce great faculty** and along the way you will contribute to all these metrics and again I can put those into context. (20)

**Institutional Entrepreneur / Implementing change / Leadership**

* When he came he more or less brought them all together and said, **we’re going to fund a few very large projects and one of those projects was the Biodesign Institute**, in fact, that was certainly the largest project initially. And, he put a lot of money into that institute. On the order of $40 million, just in terms of … Not even in terms of buildings or anything else, that came from other sources, but in **terms of money going directly into trying to stimulate hiring, stimulate the research,** etcetera (4)
* There were a lot of people that were very upset about that and they liked the way it had been before where it was much more egalitarian in terms of who was getting money for things... It was a **complicated transformation**... (4)
* President Crow did a few other things that did cause some stir. He **was not very happy with the tenure process and the uniformity of tenure and the uniformity of quality across the university** in terms of the way tenure was taking place. And, **so he basically announced** that he was going to read every single case that came up in front of the university and that **he would be the deciding factor**. And, he in fact did that for a number of years, and basically **set the bar** by doing so **in terms of what he expected from people**. (4)
* We are going to do things in a different way, **we’re going to make very large investments**, they are **not going to be** **egalitarian**, we’re going to **look at things very strategically** and say strategically where can we advance rapidly, and that’s what we’re going to do... so focus was on strategy. Now, this had, like any major movement, this had plusses and minuses. (4)
* It also meant that **hiring, which had traditionally been entirely a departmental exercise, became an exercise that was very largely controlled by forces outside of the academic units**. It became controlled to a large extent by the research strategy. Which was set by institutes and what not, and this of course caused issues with regard to the units not having control over how they were hiring faculty... The flip side is that we were bringing people in not because they could teach a certain thing or because they had a certain rapport with students or even because they were all that interested in having a certain rapport with students, but because they were spectacular in other areas strategically (4)
* The **focus on strategy** was really beneficial for the university in many ways. It put us on the map and cert**ainly increased the funding availability**, and certainly increased the calibre of our young faculty enormously in terms of their scientific capability, but it changed the culture in good and bad ways. (4)
* (However), It made certain aspects of academics a little trickier to run because now you’re dealing with a different culture (4)
* President Crow picked some people and so George Poste ran the **Biodesign Institute**. He picked George **from a very industrial background**... when he came he didn’t understand academics and therefore he was a bull in a China shop in that regard and that made a lot of people mad... He **tended to trust individuals to do some creation and I’m not sure how else you do it initially, because as soon as you put a committee of academics in place, you’re going to end up back where you started**, at least to a large extent. So, he needed a transformational change and so he put individuals that were able to transform, in charge. They took a lot of arrows. (4)
* George Post was temperamentally as ill-fitted for a university as one could possibly be, **but he was actually very well suited to being the first director of Biodesign. He had been Chief Technical Officer at SmithKline** then, but very arrogant personality and very dismissive of other parts of the university but also **someone who got things done and tried to put teams together** and so on. That was actually a very exciting time in Biodesign’ s development... After that, we had some fairly incompetent leadership and some very lukewarm leadership and I **think the institute had become much more of a standard university institute,** and I think we have actually lost some of the promise of what we could have done, had we managed to tame George Post. (5)
* But it has been nowhere near as extensive as it could have been, **had it been pushed in a hard and probably somewhat authoritarian way by a competent leader of the institute**. Now I think **the institute is largely what similar institute are at other universities**, which is a place to put good people the university doesn’t want to lose, so it gives them nice facilities... A place where people are helped enormously getting their own research programme off the ground, a place where there is more interaction than straight departments, because **we are proximal but not as much as they could be, by any means if there was actually a driving force for this** (5)
* People fail to understand is the people that lead these enterprises, **don’t have to be right. They just have to be forceful** because **nothing in science is actually ever right.** (5)
* **What is needed is a strong vision**. So, if Michael Crow had had the time and had someone else be president and could have run this institute, he would be a perfect example of scientific leadership. Even although he is not the hard-core scientists in the sense of physical sciences. (5)
* He (Crow) would be **absolutely the exemplar of a perfect leader for an institute** like this because **he would set some lofty goals** and some of them might actually be pursued, but the **important thing isn’t the precise details of the goal, certainly when its research. It is being in pursuit of something**, and that is the thing that Biodesign could do a lot better. (5)
* **George Post was very good at trying to get disparate people together** except that he managed to offend a lot of people on the campus, which didn’t help, **but he was very good at bringing multiple components together on a project** and that actually is precisely what I think we’re not very good at doing. Some people do that, but they do it as individuals. At an institute level, there is not a good organising principle for doing that at that moment and that is just a function of the folks who run the institute. (5)
* Period **BC - "Before Crow"** (4)
* Michael **Crow has been the explosive detonator that has set ASU on an amazing trajectory** but it has always been on an **upwards trajectory** and I know from my colleagues in British universities that they feel there are many external constraints. I have **never felt any external constraints at ASU** in all my career here. (5)
* And one of the things Crow likes to say is **that ‘The success of our teachers is defined by the success of our students. The success of our directors is defined by the success of the faculty. The success of the deans is defined by the success of…**’ He takes the work chart and he turns it upside down. That **your success is defined by the success of whoever reports to you**. And **the implication is that your job is to empower the success of the people who report to you**. You work in the service of the people below you in the traditional work chart. And that is again a new **mental model of leadership as responsibility rather than as privilege**. **And even after 15 years it is hard to change the mental models of people who are raised up in academia**. (8)
* If you let the **bottom-up process continue to evolve, it is too slow**... So unless **there is a top-down approach being able to release some of the typical, traditional mind-set by infusing structures** like the following, for that particular faculty member, who is working between anthropology and computer science, they do not have to be necessarily evaluated only by their colleagues in computer science. **It can be a separate committee of people** that is made up of people - computer scientists, anthropologists and people who are working across. (9)
* What you act**ually need are people who have administrative roles or leadership roles who provide a certain amount of verbal support, promotion** around the institution. (16)

**Changes / Developments in the environment**

* What has happened in the time I have been here is that the communication amongst the **scientific community has changed because of the internet**. People’s mobility has changed. (5)
* **Arizona has grown to be a place with enough resources** **to make it attractive**, and so **we have no problem now firing faculty in competition with all of the big schools.** In fact, we have an advantage in the sense that **housing prices are low here and yet we pay University of California scale salaries**. (5)
* The **notion of integrated or integrative grants** **has become foregrounded**... there is a **program called Smart and Connected Health through the National Science Foundation and also the National Institutes of Health** that has just, they re-issued the call. It is about, it has been around for about maybe four, five years now. **They just re-issued the call and said they are only considering integrative proposals that are explicitly inter-disciplinary** which is great (17)

**Problems with Gender Equality / Diversity / Minorities**

* it tends to be biased **against economic minorities** because economic **minorities have a tendency to be less well prepared when they go into the first steps of education** and so they’re less likely to be in the hottest lab at Harvard by the time they get to the post-doctoral part of their study. And, so the question is, **is that good for ASU to only hire people that had all the advantages** all the way along and so they’re in the top, the pinnacle of that sort of situation. And, these are the discussions we have and like I said, **it’s easy to get consensus when everyone’s sitting in a room and it’s all theoretical. It’s much harder when you’re looking at a set of files and you say, oh my gosh, this person has done all this fantastic and interesting work, we have to hire this person**. And, then you say well, is this person actually the best for us? And, that becomes hard, that’s a difficult calculation. (4)
* I started here in August of 2015 and I was pregnant. My son was born in December of 2015 and **because I had not been here a year, I did not qualify for the family medical leave act. And so, I was not required to get maternity leave**. So I had **six weeks of unpaid leave and then I returned to research and teaching. That is not a great policy** and it has been a very challenging year for me personally and professionally. I have not published an article in a year because I had more important things to do frankly and so, **those kinds of things which are not particular to ASU - they are particular to the United States** - **are not supportive of women in academia**. I mean I do not feel discriminated against in any kind of one on one way, but I am aware that all of the senior people in my department are men. (18)

**Diverging understanding of Impact**

* That is there seems to be a disc**onnect with the economics and business community**, because I have always made the point that **researching responsibility without knowing whether something is going to have an impact through a market is meaningless**, in the sense that the only **thing that matters is something that can be propagated through markets**. I have never heard this question addressed by any of the folks I have talked to and I find it very frustrating because otherwise it seems to be a very abstract discussion.(5)
* Research in which the **focus of actions needs to be economic and political, rather than with researchers** because you could have an army of researchers developing and many of my colleagues have been involved in projects funded by the Gates Foundation, but th**en the developments are never used because the drug companies make no profit**... So I can imagine a lot of folks working in those fields who felt compelled to do it for the greater good of humanity, and now their vaccines are not being used right. (5)

**Who should evaluate ethical aspects of research?**

* as a matter of personal feeling about scientific responsibility, **there are things that I would argue should not be carried out in university research environment**. Obviously, examples are now with gene editing technology, there are enormous potential ethical problems with that. But having said that, the actual thing that would decide how people behave is in fact markets. So, I sometimes wish I was a brilliant economist who could figure out policies, strategies that would help. (5)
* The **scientific community can warn of risks of technologies**, but then you have to realise that we will all be gene editing our children if we thought it would make them better, smarter and make them more economically capable looking after us in their old age, unless there was some other political action. It only takes one scientist to set up a commercial company, gene editing your embryos and then it is all over, right? So, this is why **much broader approach to these problems is needed and important**. (5)
* There are some **areas where the community needs to regulate itself** and maybe even have legal regulation. But as a last resort, because I can’t think of an activity in **which free speech is aware is more important than science**. (5)

**Leadership vs Research**

* **Team players**! We have actually made conscious decisions not to have people on proposals or on projects or in leadership positions on initiatives where basically **they are very well known to be exceptionally good individual performers but fundamentally are disruptive to the team dynamics**. We are very rigorous about this. We really focus on, is there going to be a really good interpersonal dynamic, is there going to be good chemistry, are people going to want to complement each other? And that is something again which maybe from a researcher perspective seems trivial, **but in the academic environment is almost counter-culture because almost everything in the academic environment is focused on individual performance**. I think that has actually kind of been a big important thing for us, that has worked quite well. (7)
* And also vice versa, if you have **people who are really good in co-working and building teams, when it comes to promoting them for tenures, It is hard to assess their individual contribution** (7)
* You have to do it incredibly carefully because **you never, ever, ever want to ruin someone’s chances for tenure** but I also think that a lot of the qualities that people identify as contributing to leadership capabilities and capacities, they start emerging early and **you kind of have to catch them early and encourage them early. I think it is entirely possible to both encourage leadership and team building and support tenure**. I think we are actually often hurt more by being conservative and not selecting those people to lead because we worry about exactly what you just said, but we have, I would say, a really good example. (7)
* If someone says to us, not now, because I am working on a paper or tenure or whatever, I mean, this is an academic environment, we have to appreciate that. I **appreciate that it is a general challenge but I think one of the things that we can do to address this challenge is be a little bit more bullish on encouraging leadership opportunities in more junior faculty.** By the time you get to someone who has grown up in a traditional academic environment, and they have just now got to tenure and they have never done any leadership or team building or collaboration, It is going to be very hard for them. (7)
* I do think the University is getting much better at understanding that **leadership needs to be valued probably at least as much as sort of scientific academic contribution**. (7)
* I think that perce**ption needs to change both at the faculty leve**l and then also, you know, from our perspective again, **I would encourage my counterparts around the University to give more of these opportunities to more junior faculty** because that is how we build the culture of academic leadership. (7)

**Problems with inclusivess**

* I think, you know, **being known for who we include and how they succeed rather than who we exclude is something that we support and live with every day**. Again, we have 3 000 some odd life sciences majors and so we are inclusive as is everyone else. **And one of the challenges of the inclusivity of ASU that we see at the school level is, we get students who come in with varying levels of background in terms of preparation for succeeding at the university level. And so, it becomes a challenge of how do we take the students who are, do not have as good of a background and bring them up to where they need to be to be able to succeed in the school**. And it is a challenge; it is an issue that we deal with virtually every day. (21)
* **part of the issue is that we are trying to become inclusive and be inclusive while getting less and less support from the state**. And so, you know, state funding is now less than ten percent I believe of our total, of ASU budget. And so, and most of our faculty members come from the state part of the budget and **so it is difficult to increase the number of faculty members at ASU unless state funding starts increasing**. (21)