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What's BYU Doing Making Cartoons?
A Brief History of Computer Generated Animation at BYU

House of Learning

404

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HOUSE OF LEARNING LECTURE

**WHAT'S BYU DOING MAKING
CARTOONS?** A BRIEF HISTORY OF COMPUTER
GENERATED ANIMATION AT BYU



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"Prepare every needful thing... even... a house of learning." Doctrine and Covenants 88:119

WHAT'S BYU DOING MAKING CARTOONS?

I appreciate the opportunity to be here. That's why I always start out with my presentation thanks, because I think that's maybe the most important thing that I want you to get out of this, is how grateful that I am for the opportunity I have at BYU, and to work with such great students and administrators on campus. I am also grateful for the opportunity to have a question and answer period when we are done, and if you don't get the questions right, I get to give the presentation again.

So the topic of the lecture is "What's BYU making cartoons?" I get asked that a lot. In fact I ask myself that a lot. Why are we making cartoons? In reality, that's not the main focus of what we are doing. The first thing I want to do is talk a little bit about the state of the entertainment industry.

So, in the United States, Finding Nemo in 2003 sold 28 million copies on DVD. Shrek 2, 20 million copies. Consumers spent a record 21 billion dollars renting and buying DVD's in 2004, and DVD retail sales grew to 15 billion dollars in 2004, so it is a huge industry. Shrek 2 made a half a billion dollars in US ticket sales, a half a billion dollars world wide ticket sales, and a half a billion dollars in DVD's. So Shrek 2 made a lot of money. It takes about 120 million dollars to make the movie. So, it's a used thing.

So, my generation sports figures that I looked up to, this was the icon. If you got on the cover of a Wheaties box, that was a big deal. So what's our sports icons today? Where are they found, EA sports. They're on some computer game, that is how the industry changed, that's how society has changed, and that's the impact of the entertainment industry on, society. So there's, there's a game company called EA, Electronic Arts, one of the divisions is EA sports. This list on the screen is the leaders in market capitalization in software companies. You'll notice that Electronic Arts market capitalization is 15 billion dollars of the fifth largest software company in the United States. EA sports made one and a half billion dollars on their soccer game; they made one and a half billion dollars on their football game.

The process to generate movies and games is constantly changing. It's changing a lot. In the entertainment industry when I'm talking to them, they explain to me that more and more they're expecting people to be able to use both sides of their brain. If you talk to Disney feature animation, they want to hire either an artist that can write software code or they want to hire a computer science major that can draw the human figure. So, there's a movie being made right at a company called "Weta" in New Zealand, and it's a remake of King Kong. And we actually have several former BYU students working on that project. And in the Wired magazine, October 2005, Naomi Watts was talking about how hard it is to make a movie. Because it used to be when you made a movie you had the other actors, you were on the set, the director would say "Ok, this is your inspiration, this is what happens in this scene." But more and more what happens, is the actor's in front of some kind of paint blue wall or painted green wall, there is no other actors around, there is no visual effects, there is no set. And they just have to act, have to pretend that something is happening there. And director Peter Jackson, who is also the director of the Lord of the Rings movies, told Naomi Watts "you've got to get used to it, this is the future of film making." So everything is changing.

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So here are some other changes. The film industry makes a major change every 25 to 30 years. Ok. First it was, they brought sound and then they brought color, and then they had wide screen, ok. And then they had, you know, stereo sound, and other kinds of things. The gaming industry, industry obsoletes itself every five years, because they come out with a new game consol. And the cost to make those, those games increases dramatically. So the first generation playstation, the average game costs about a million dollars to make. Playstation 2, the average game was 3 to 5 million dollars. Then next generation, the Xbox 360, the next generation Playstation 3 the average game, the budget for the game alone is around, average is about 15 million dollars. In a conversation with gentlemen at Electronic Arts, EA sports, he says that he they are working on a game right now, and that game has a budget of 25 million dollars. That does not count any of the marketing or any distribution, that is the budget to produce the game.

So what are the jobs in the industry? Well, the interesting thing about the entertainment industry is there's a huge wide variety of, of jobs. There are jobs that require more of the pure arts side, they're doing character design, they're doing illustration, they're painting, all the way to very technical computer research. We've got to figure out the best way to do water, the best way to do smoke, and there are a lot of jobs in between. And knowing that the jobs are there, open up a great opportunity for students in programs.

What's the money to be made? Because those are questions that are asked a lot. Quite significant actually. The average BFA degree, degreed student, about 7 years ago in the United States according to, one major research survey. The average BFA student, bachelor of fine arts student in the United States, made 12,000 dollars their first year out of school. And of that 12,000 dollars, 8,000 came from non art related income. So that's probably hamburgers at Burger King, or selling shoes at some SEARS or someplace. Our average student in the animation program right now is probably starting right around 50,000 dollars. We've had students with bachelor arts degrees start in the industry near 90,000 dollars a year to start. So money is significant. Now we are not chasing careers because of money, we are not chasing careers because maybe there's, you know, necessarily an opportunity there, but I think its indicative of what the opportunities are and what the future is and some other opportunities for students.

So let me now talk about design visualization at BYU. A few years ago when I first started teaching at BYU in the design department, we had almost no equipment, and I was hired to basically be the faculty member that got the design department computerized. So we had photography, illustration, graphic design, and industrial design. We had a couple of computers; one of the computers had 640K of RAM and a 20 MB hard drive. We just didn't have very much equipment. So I actually went around to a lot of faculty on campus here and, to try to find out if there was any access for our students in the equipment and of course there was very little access anywhere else, cause they didn't have much equipment either.

So Doug Chabries, who was at the time was the vice president of technology on campus, helped me understand that AT&T had a hardware donation program. But the problem was, is that you had to either be a science or engineering program to apply. Well I called up AT&T and told them that I we were an art department slash design department. I told them that I would like to apply. And they said sorry we can't, that's our policy. Well I thought, we should apply anyway. So I filled out all the application and I put together a huge document explaining why the design

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department at BYU needs to be included in this donor program. And they called me up and they said, we've got this, we receive this proposal, and we just wanted to let you know that you're not a science or engineering department, so you don't qualify for the donation, thanks for sending it in anyway. Well, it was worth the effort and it was worth the time, but you know I just felt like I should apply. Well, I got a phone call about a week later saying that they really enjoyed the application and they were actually going to pass it on to the next level. And they weren't sure why, but they were passing it onto the next level. Well, to make a long story short, the design department was rewarded a huge hardware donation. And it ended up being the only donation that AT&T had ever given an educational program. Why did they do that? I think some of us why they may have done it.

There is another hardware company that I can't name because they told me a long time ago they would sue me if I named them. I worked with the president of this hardware company, they did hardware and software. It was a 10,000 person company and I had met him at a conference and I told him how bad we needed equipment in the design department at BYU so that we could do some 3D stuff and visualization stuff. And I explained to him that we really could use some of his hardware. And he said, well we don't have any kind of donation program, that's policy in the company, we don't donate to schools.

Well, he called me up about a month later and says; help me understand what you would do with some equipment if we gave it to you. So I kind of over the phone, you know, told him what we'd do, and says "well I was just curious." And I ran into him at conference about 6 months later, and we got talking again. And I told him I was going to fill out a big proposal for equipment from him. And he says well we don't donate, and I say ok, I'm going to do it anyway, knowing that I had been encouraged by AT&T, I'd heard this before. So we put this proposal together and I really felt I should do this. So I put together a proposal. They donated about 3 million dollars worth of hardware and software to BYU. So, I put together a big thank you letter, I put together a big press release, I sent it to him. I said this is what, you know what we would like to publicize as kind of a thank you. I got a phone call back from their legal department telling me that they would sue me if I did any kind of press release announcing that they had donated to us. And I said how come? And they said well, we have a policy against donations and we don't want any other school to be asking us for equipment. So, you just absolutely can not publicize that you received this donation. And I, so I called the president back of this company. So why'd you donate? He said, "I don't know it just felt right." So I think that starts to be an indicator of some of the history, some of the reasons why I was encouraged to continue pursuing what we are doing.

So I used this equipment, and I started teaching some classes in animation and other kinds of things in addition to other classes. One of the students, who worked on this equipment named Dan Lemmon, he worked on an animation that I'm going to show you in a minute. And that animation allowed him to get hired on at the company that did Titanic. So Digital Domains a company he worked for, they recently they'd done "How the Grinch Stole Christmas," they did "I, Robot." Well, I was at a conference with one of the executives of Digital Domain, and he was talking to the technical editor for the LA times and she told me that that they'd just been talking about this student of mine, Dan Lemmon and that this vice president of Digital Domain told her that Dan Lemmon was the smartest employee that they had at Digital Domain. Now this was a

first year Dan worked there, he only had a bachelor's degree in industrial design, but that is some of the impact that we are starting to make. So he, and another student, Matt Paulson spear headed an animation called "The Brief Social Life of Henry Whickam," which won first place in probably the most prestigious computer animation contest for students at the time. So, if you want to play, "Henry Whickam," we'll see how this goes. This was done about 9 years ago.

Movie One: The Brief Social Life of Henry Whickam

Really, the natives can be so headstrong. Well if anyone knows what I'm talking about you do. Am I right? Anyway I said to the chap "Pumba," I believe that's what his name was. I said, "Let me have a ride on the elephant, let me have the reigns of the elephant." And he wouldn't let me, I mean it was my safari, I'm playing for it. I should be able to drag the darn thing don't you think. What will I do, everyone is headstrong. A natural consequence of poor education. I tried to open the little fellows mind with a discussion. I said to him, I said "you know, need you said if you are looking into an abyss, the abyss is also looking into you." Now how can you be looking into an abyss that is also looking into you. Sean Paul saw this portion and had a similar view of me with the existence of God, now not really existing if you want to put it that way. Which I do. Now, Nechi and Sadry, if you put the two together. Well I, I guess you would be in an abyss that doesn't really exist looking back at you. Which is what I was saying to Clarence. You know we really should have you over some time. Oh, Clara would love that. Our chef Pierre, he is truly exceptional in his...(music)

"I was stuck there and I said what I am doing so high up here."

"Well because every, every Studebaker comes with air conditioning built in."

So, by today's standard its pretty lame, the animation is pretty lame. But, at the time it was very difficult. It was done with software that was difficult to use. We had very few computers. Luckily we had the donations and some donated software. But what we realized was that there was an opportunity if you work hard and if you try to do things that are difficult to do, and that starts to separate you away from the competition. And as one of those, one of those mentoring opportunities where we realize that that the harder it is, the better it is. Because that means that, that competition is gone so the hard things become your friend if you are willing to work past the difficulties. Well, what was difficult about this is at the time, not very many people were doing much with human character animation. And you can see why we did some things. Ok? The thing to understand and the comparison is that industry quality animation or special effects on average about a million dollars a minute. So if you look at "Toy Story," if you look at "Finding Nemo," if you look at "Shrek," those are actually usually more than a million dollars a minute. There's some more inexpensive one like "Ice Age" was a little less than a million dollars a minute. A lot of "Star Wars" shots are over 2 million dollars a minute, so that is kind of the expectation. And I found that our animations are judged against the industry, just because you know that is what they are used to seeing. That's what people who you know go to film festivals, they are used to see that quality and that's what we are judged against. We don't have a million dollars a minute to work on our projects by the way.

Well, what happened was that the design department merged the design and visual arts departments together; about the same time that the industry was saying we need more technology from the industrial design programs. So we were designing cars and boats and motors. We were doing some of this animation, and the industry kept saying you need more technology, you need

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more access to milling machines, you need more access to computers and software. And so we looked around and we noticed that there was an opportunity in the college of engineering that would house the industrial design program. And I was heavily involved as a professor in industrial design, so luckily Doug Chabries who had been the vice president of technology to help us get the AT&T donation, was now the dean of Engineering. So Doug Chabries and Richard Christianson, who was an associate to him, worked really hard to help us find a home in the college of engineering and industrial design.

Well, to this day as far as we know BYU is the only University that offers a bachelor of fine arts degree in the college of engineering. But the industry loves it. When we did that we added an emphasis of automotive design and digital design to industrial design because there was such a need. Well the other thing that happened that a lot of people will say was coincidence, (I say it was about as much coincidence as AT&T giving us a donation, and the other hardware company giving a donation) is that we hooked up with Ira Fulton as a donor. And he agreed to give BYU a super computer. Well there are some things about the super computer that a lot of people don't know. One of the things is, is when we worked with the vendor, the vendor kept telling us that we were buying too much memory. We were buying too big of a super computer because it basically was the first super computer at BYU and other universities had similar size super computers, but they had had them for 8 or 9 years. And they actually called me up and they said, "We just wanted to go on record. We think that BYU is buying too big of a super computer." Now when was the last time that you had salesman tell you that you were buying too much from them? So that let's you know though they were really concerned that we were going to get this piece of equipment, and that we wouldn't utilize it and that we would maybe then , speak negatively of that company. And they wanted to go on record that they thought it was too big of a purchase. So, we purchased the super computer. Three weeks after it came, Ira Fulton came back to check on how we were doing, and the computer, the processors, and memory were all completely being used. He thought that the animation students then had got their hands on it and taking over the whole machine and that we weren't rendering and it was being done by other people on campus. Which had him decide well we are gonna need to expand and we immediately started to expand that system.

Well, some of the things that we were doing early on in the super computer was we were creating these three dimensional environments and we were walking around them. And we also had a virtually reality theatre created, so you could put on 3D glasses and with a joystick walk around in these environments. The student who worked on this has his name in the credits of "Lemony Snicket's," as well as "Episode III, Star Wars." We are also doing some visualization so we built Herod's temple, and we walked around Herod's temple. We were doing just some pure visualizations of things, this is done with some software that Pixar donated to us. We are working with some of the major boat companies and we would build 3D computer models of the boat and spin them around inside the virtual reality theatre. Some worked with Coleman. This is some work we did with General Motors on some visualizations of the next generation Camero.

Because of the super computer, the virtual reality theatre, and some of the other things we were doing, General Motors, EDS, and sun Microsystems, donated over 300 million dollars to campus. This was at the time about the fifth largest single donation that any University had received from anybody in terms of dollar amounts. So you can see the growth of the

opportunities. And its hard to deny the impact, it is hard to deny someone's hand in softening the hearts and minds of some of these individuals for them to open up their pockets so we could do things. So, when we had this digital design major, the students in industrial design created an animation called "Lemmings."

>>Movie Clip: Lemmings

So we did Lemmings. Lemmings won a student academy award. It won a student Emmy. One of things we try and do and when we create the animations is try and figure out our own look and feel. We try to avoid you know kind of the toy story look. Well one of the things that was hard on this that the original story idea had four lemmings. Cliff was going to try to stop his 3 friends from this migration. And so we only had 4, but we decided any other school can do that. We now have a super computer, we have million of dollars worth of donated software, let's do something that's hard, let's do something competition can't do. So we then thought, well let's put in 50. So we started writing some code. We could have 50 migrating, flocking lemmings. And then we are kind of talking about it, well at the same time we are reading the Book of Mormon right? There are 2,000 stripling lemmings, in our thing, and so we talked about it, that's hard. We did it, the industry went crazy.

Disney television called me and asked me if they could use our characters to host Disney playhouse. It ended up not happening because they wanted us to do all the animations for every week and all that stuff, and I tried to explain that no, we only have like 18 students. We can't do this. Tom Seda, who is the president of the animators union tried to talk me into submitting it to the regular academy awards. He also teaches at USC and UCLA and he says they aren't doing anything like that at those other schools. Lemmings has played in festivals around the world. If anybody flew on Frontier airlines in the month of September, Lemmings played as part of the in flight movie entertainment and played to about 3 quarters of a million people. So let's talk, quickly about the student Emmys. The student Emmys has two categories with three winners in each category. There's a traditional animation, there's a computer generated animation. So in the last two years, they have given 12 awards, BYU has won 3 of those, so we've won one forth of the student Emmys given out over the last two years. And in that bottom one is kind of an indicator of how hard this is and what the competition is. They had 415 entries from 139 schools from 38 states. So if you subtract our 3 out and that leaves 9 left for all the other schools. The students worked on that movie, so it was done 2 years ago, have gone to work on "Garfield," "Scooby," "Episode III," on and on and on, "King Kong," "Tiger Woods Golf." I mean, to go from being a undergraduate student to work on these movie and have the name and credit of movies in 2 years is actually quite phenomenal because most movie studios have an unwritten policy that they don't hire students straight out of school, you have to go somewhere else and work.

Marcilyn Cannon is a good example of one of the students that worked on it, he got 3 job offers in 3 days. He was hired, he was offered a job to work on "I, Robot," he was offered a job to work on "Garfield," at a different studio. He said no, I really wanna work on "Episode III." But what really convinced him, is cause two of those studios in Los Angeles, one of those studios in San Francisco. He's single. So he went and visited the single's wards in those two areas and chose San Francisco.

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Tom McKoda was working on "King Kong" in New Zealand and he emailed me last week and said that he just got hired on at Sony. So he starts at Sony pictures, cause "King Kong" is finished, so he starts at Sony in January. But on his demo reel, he had some of the "Lemmings" stuff on there and even though he's got all his work from "King Kong" and some stuff at a place they did in Australia, they wanted to talk to him about his "Lemmings" stuff. They just couldn't believe that work like that was done by students. So he emailed me and said they didn't care about "King Kong," they did care about the other stuff, they only wanted to talk to me about "Lemmings."

So we now have an animation major approved on campus, its multidisciplinary, its across two colleges, college of fine arts, a college of engineering. Its pretty amazing, so then we created an animation called "Petshop." So let's play "Petshop."

>>Mother: Go take a look around. Hi, I'm looking for something for my son.
>>Pet shop owner: Did you have anything in mind?
>>Mother: Well, not a lemming, we've had trouble with those.
>>Pet shop owner: Ok, how's about this a over here.
>>Mother: Just pick one Billy.
>>Child: I want the chinchilla
>>Mother: He's cute.
>>Child: He's gonna be my best friend. He totally beat up the lizard. You should have seen it.

So that's won stuff, its playing all around the world. It is playing in 2 weeks in Madrid, Spain. It won best foreign short film in Kawasaki, Japan. So this is some of the space, and why we're grateful for donors and the University. It was the third of a million files we generated to create "Petshop." So we're doing this panerally effect. We were creating all this stuff, there's some of the hard things. A lot of drawing, a lot of computer science stuff; students have gone on and have done some great stuff. So we also are working on some animation called "Faux Paw," which also won an Emmy. And this is a public service announcement that we did for Micheal Levitt and Jackie Levitt. Micheal Levitt is the secretary of health and human services right now, and if you go to ikeepsafe.org, you can watch it there. There is a proposal to the appropriation committee, so we'll see if they can get funding to put a copy of it in every elementary school in the United States.

So we are working on a project right now called "Noggin," it will be done in a month. Some of the students who have worked on it, are already hired, in fact most of them are. A lot of them were hired by Avalanche software which is a division of Disney games. Alex Cannon who is the director of it, who was just hired last week to work on Spiderman III. So it's a story about myths that were prevalent during the time of Shakespeare about some, some creatures that had their faces on their stomach instead of their head. So the inspiration on this one was hard as to try and make it look like old illustrated field book. So this is actually a 3D computer model that one of the graduate students in computer science created for us. So, a lot of the work on this is part computer science, part animation students and we try and do a lot of it. So, I've got just a couple of clips. There's no audio on this thing because it's not done yet. So if you think of Rudolph the red nosed reindeer. That's kind of this story right? You are different and so you get mocked

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cause you are different. And some of the conflict, so here they are mocking him. And things happen to him, he hits his head all the time, he creates problems for him. They are out hunting deer and he scares the deer away cause he has a head. So they launch a scheme and they say we can fix this if we paint a face on his stomach and we cut its head off, then he's going to be like one of us and we won't mock him anymore. And so, they get ready to help, they, this is a comedy ok even though it doesn't look like it. This is common. They get ready to help him alleviate his problem of that, that thing that is always in the way. So this is about a month from being finished, and we'll see where that goes. Ok, so that's "Noggin."

We are working on an animation right now with the senior group called "Piñata." We just finished one called "Turtles." And you'll notice that the look and feel is different. We are working with the theatre department called "Dear Oslen," and it has a completely different look to it. So, how's our animation major perceived? Well, we are on the list of school that hire from, Vern Wilbert is cg supervisor at digital domain. Digital domain did a demo reel for me of all their work and then the president of digital domain called me up and said "I'm really embarrassed cause I just saw a cut of this demo reel and I'm really offended." And I says "what are you offended about?" And he says "we put some of our beer commercials on it." And I says "that's ok." And he says, "but we made that demo tape just for BYU so we can show some of the work, and I told him not to put anything on there that would offend people at BYU."

One last story. I ask a head of HR at one of the studios what we should do so they would keep hiring our students. She said, keep, make your students take religion classes. So is the industry, attracts a lot of creeps and we like your students (laughing). So, , so what's the future? Well, there's a lot of students out there that are now owners of computer game companies, they're overseeing facilities at movie studios. I thought we would get into these animations and the long term, we might be able to make impact on society. We might be able to tell better stories. We might be able to, to do product or proud of but I thought it would be years and years and years. Mike Warner was one of the students who was an animator on both "Petshop" and "Lemmings." And he has now signed a deal, he is directing a feature length animation and he only graduated a year and a half from BYU. It's his own story and he gets to direct it. So my advice is, do something hard. Work really hard.

Back to the question "What's BYU doing making cartoons?" Well I hope some way, some how as we send students out into this industry that we can make an impact. I was asked early on when we tried to create the major, why we would do it. And my response was that my kids watched movies, my kids play computer games. And if we aren't doing something in that industry, because the industry is not inherently wrong, but if we aren't doing something to, to put our students into that industry so that we can create alternative, then how do we complain cause our kids still will watch movies and they still will do computer games. And I think that's why I'm passionate about what we're doing at BYU. And I am just very grateful for the opportunity I have to do it. I am grateful for the administrators, I am grateful for the deans, the department chairmen, everybody involved, especially you know, the donors. But really especially the students that work so hard. So, that's why we are doing cartoons at BYU.