Deming System of Profound Knowledge vs Lean and Six Sigma
Interview with Mustafa Shraim

0:00:04.1 Andrew: My name is Andrew Stotz, and I'll be your host as we continue our journey into the teachings of Dr. W. Edwards Deming. Today I'm here with featured guest, Mustafa Shraim. Mustafa, are you ready to share your Deming journey?

0:00:19.8 Mustafa: Absolutely, let's go for it. Thank you.

0:00:21.5 Andrew: I'm excited. Well, let me introduce you to the audience. Mustafa Shraim is an Assistant Professor at Ohio University teaching quality management and leadership. Professor Shraim has over 20 years of experience as a quality engineer, corporate quality manager, and consultant. His PhD is in Industrial Engineering. He publishes widely, and he has a passion for Dr. Deming's system of profound knowledge. Mustafa, why don't we start off by you telling us the story about how you first came to learn of the teachings of Dr. Deming and what hooked you in?

0:00:57.5 Mustafa: Yeah. Thank you, Andrew. Thank you for inviting me back. So...

0:01:01.9 Andrew: Yeah.

[chuckle]

0:01:06.1 Mustafa: The whole thing started when I was doing my master's and that was the late '80s, at Ohio University, and I was concentrating on the area of quality. So, I was doing research, and my research touched up on what Dr. Deming was doing. I was doing it in design of experiments and quality tools and things like that. But of course, you come across Dr. Deming's work when you talk about quality control, in general, and statistical quality. So, that was the first encounter of learning about what Dr. Deming did in Japan and how he used statistical process control and things of that nature to teach how you can improve your processes, your products, and later on, the management. But at the beginning, I did not really get into his management philosophy so I was more on the technical end of Dr. Deming's teaching which was mainly quality control and SPC, and just improving quality in general.

0:02:24.1 Mustafa: So, as I went... So I went, and I started my first job as a quality engineer, and quickly after that, maybe after one year, I moved to another company, and I became a statistical quality engineer, and I was doing... I was a part of a training program there. I was doing training on SPC as a part of a training for employees at that company. It was a union shop, it was automotive, and so we utilized statistical process control and what Dr. Deming was teaching. So, that was the beginning of it, but later on in the '90s, I started learning more about Dr. Deming after I read "Out of the Crisis" and then "The New Economics" about his management method. In fact, his management methods just captured me. I knew I got hooked on the quality part first, but the management method just brought it together for me. And since then, I've been reading and practicing, trying to at least, what Dr. Deming has taught.

0:03:41.9 Andrew: And would you say... One of the things that I started realizing was that the

statistical... What I thought was the end was the statistical tools. And what I started to learn is that, actually, the statistical tools start to have limitations if you're not doing the management of the whole operation in a good way. And I think that that's something that really resonated with me when I started putting the pieces together. How do you see the role... And in a little bit I'm gonna ask you about some more specific tools, but just generally, we have statistical tools, but we also have management. Many people may think that you can just apply statistical tools and solve all the problems, but I'm curious how you see that interaction between the tools and the management style.

0:04:30.2 Mustafa: Well, as you know and many, probably, of your listeners already know that Dr. Deming had understanding variation, or some variation, as a part of his system of profound knowledge. So, understanding variation, under it, is really learning how to distinguish between the types of variation that you would have in any situation, managerial or process situation. So, that interaction there is really big. That really captured me because what Dr. Deming says is like, more than 80% of the application for statistical process control is actually, should be in management, and not necessarily just on the line, controlling quality of the product. So that was... It captured me, and because of explaining how many managers, many supervisors, don't understand the difference between common cause and special cause variations, and they start managing people with common cause variation going up and down, and they reprimand if it goes down, and they praise if it goes up, and that actually just makes things even worse in the future. As you probably know, it's tampering with the process.

0:06:08.8 Andrew: The best way that I've ever come up to try to explain this is to say to people, "Imagine there's 10,000 people in a stadium. They all flip a coin, and you say, 'Hey, if you flip heads, go to one side of the stadium. You flip tails, you go to the other. Everybody sit down. Okay, now... '" Or basically say, "Flip the coin again, and if you flip heads again, so two times, stay standing. And if you flip tails two times, then stay standing, but if you hit the heads and tails, then sit down." And now, your audience is getting smaller and smaller. If you do this 10 times, you will have 10 people, generally, you're gonna have 10 people that have flipped heads consecutively 10 times, and people that flip tails consecutively 10 times.

0:06:54.1 Andrew: And if we said, if we started off the whole game by saying, "Tails is bad." Now you've got some people that have done bad 10 times in a row, and some people that have done good 10 times in a row. But we know, because of the design of that example, that it's purely random. So, the question... So, we can understand that, but when we think about random variation, what Dr. Deming started to do is show us how that fits into management and psychology and how we're missing that. I'm just curious if you can help us to understand how that variation fits into that management 'cause you started talking about rewarding and all that. So, just curious about how those things fit together.

0:07:38.7 Mustafa: Right. For example, within the control limits, and those are the limits that are on a control chart, and they are spaced three standard deviations up and three standard deviations down. All the variation within is mostly a common cause variation, and it's due to the system. It's a system variation. It's not attributed to any special cause whether it's operator or something else that changed. So, distinguishing between the two becomes very important because if you don't look at variation from the perspective of a control chart, what happens is that you are in the weeds, and you look at every point as either really high up or high down cause you don't have any perspective as to how to evaluate or filter this type of variation. On the other side, also you don't want to not react to

something that is special. For example, if you don't have the control limits, and if you don't have a proper way of looking at the variation, then you might end up also passing a special cause as a common cause, or not reacting to it enough to fix it and to make it a part of your controllable system before moving on.

0:09:16.7 Mustafa: From both perspective, I think it's very important for managers, for leadership, to understand why we do this. It's not just something that you have to do on the production line. It is something that you have to do in management based on performance. Look at your data and see if it's a stable process in control or if it's not, then you need to start eliminating those special causes. Like Dr. Deming said that, "Nothing really is born perfect as far as the processes." I'm paraphrasing here. But when you start a new manufacturing process, it doesn't mean that it's going to be in control; you have to work at it. You have to eliminate one by one all these special causes that come up before you start seeing a stability. And then after stability, then you will be able to work on the system part of the process, which is a long-term continuous improvement projects.

0:10:29.9 Andrew: Yeah, it's interesting. I remember a story. When I was working at Pepsi, we had a bottling plant in Los Angeles that I worked at. And the management were putting pressure on the people that were running the bottling machine because the variation of the level of the liquid in the bottle was getting wider and wider. And so, as a supervisor on the factory floor, my job was to go and kick ass, basically, and tell the guy, "Hey, come on, what are you doing here? You're messing around." And he just said, "Look, Andrew," and I was a young guy who listened to what these guys said, and he said, "Look, look at that machine over there. They spent the money to buy that filling machine over there, and you see there's no variation. Look at the old machine that they've got, and they haven't bought the parts to repair it. I keep telling them, if they don't buy these parts, I can't get to that point." And he was like... And I realized at that point that it was a management decision that needed to be made to reduce that variation at that point. It wasn't an operator that we should be punishing for that. And I think I wasn't that popular bringing that information back to management 'cause they wanted to say, "Well, no. It's the worker," and that's where I started to think about that common cause variation, and how do you improve and reduce variation?

0:11:48.3 Mustafa: Right, right. And if you leave it also to the worker, sometimes if they don't know what to do, they start tampering with the, actually, production process, and it makes it worse. So, a training for them on variation is also important. It's not only for management but also for workers as well.

0:12:08.2 Andrew: Yeah, good point. I know your expertise in this area is so valuable, and I think that it's great to have you maybe break down the following four terms that we hear, and maybe just generally discuss the differences, and then we'll talk about them in more detail. But the first term is Lean or continuous flow, the second is Six Sigma, the third is 14 points, and the fourth is system of profound knowledge. So, maybe just give an overview. What are these things? What do they mean?

0:12:40.0 Mustafa: Okay. Well, the Six Sigma part came about in the mid '80s and started in Motorola, and a lot of people already know that. And the reason it came out is because Dr. Deming's contribution in the '80s just brought a lot of attention to variation. In addition, you have also some big issues like the Ford transmission issue that came up. And there was a study about variation, and so there was a lot of attention being focused on variation. So Motorola... Somebody at Motorola, Bill Smith, an engineer over there, actually, came up with this idea of Six Sigma. And

what that means, in general, is that if you have a spec that is a certain width, like upper and lower spec limits, then you want your process to operate in about half that space. Basically, that gives you good capability of the process, and then you don't have to worry about it. The first problem that came about from Six Sigma was the controversy about the shift. The people who invented Six Sigma, or packaged it together, said, "Okay. Well, we know you wanna operate exactly in the middle, but, normally, processes shift like one-and-a-half standard deviation here, or one-and-a-half standard deviation there so we want to allow that."

0:14:18.7 Mustafa: So, that is one of the biggest controversy because when you shift something like that, the process may be out of control without knowing. So, they did not really take that into consideration, although they are teaching control charts within the Six Sigma body of knowledge, so that was not really taken care of there. But that was one of the flaws that is out there in Six Sigma. Now, there are topics in Six Sigma that are... They're okay. We can teach certain topics on continuous improvement, root cause analysis, things of that nature. But the statistical thing here was wrong. And again, the reason Six Sigma was popular is because it is packaged the way it was packaged. You have companies buying this, and you have all the titles that came with it, and you know how companies love titles, especially here in the United States. So, you got all the belts; everybody must have a belt. You gotta go through training, you gotta... And then after you get your belt, what happens? You're gonna save us money. You're gonna have to do projects, and your job is to save me 20, 30, 40, 50,000 or 100,000 sometimes. So, that was the Six Sigma part of the whole thing.

0:15:51.6 Mustafa: And so, the Lean later became Lean Six Sigma. But Lean, by itself, came from Japan, originally. It's eliminating waste. Think about things like over-production, waiting, inventory, extra motion, all of these little things that you think they're little, but when you put them together, that's a lot of waste. So, to make the process flow better, you need to eliminate all of this waste. It's more about productivity and moving things faster within the organization. Then, when we contrast that with the 14 points, the 14 points are the system for management. It's all about... It's about management. It's also about quality, like improving forever the processes and systems for example, and have a constancy of purpose like the first point says. This was the application of what then became the system of profound knowledge as we know it. I don't know... I don't wanna go too far with definitions and things like that, but the Lean Six Sigma, they had the problem of the statistical flow from the Six Sigma part, and then you have all the management by numbers, management by objectives from both the Lean and Six Sigma.

0:17:30.3 Andrew: And I'm gonna try to summarize what you just explained by talking about the Six Sigma. Is what you're saying the flaw or the issue was is that, in order to try to get good quality, why don't we just set our expectations of what we're gonna get out of the system so tight that when we actually produce, we're in a narrow range, but we're never... Let's say we don't allow... We built the system with so much margin of error that even if we move around in our output, that that still is within a very tight range. Is that the concept?

0:18:10.5 Mustafa: Yeah. That is the concept. But the problem with that concept is, if you move around, if you let the process move around one-and-a-half standard deviation, for example, which, what it says, this indicates that you could have special causes that you don't react to. You don't know at that point because you have moved the process. You end up having special cause variation based on that shift because that shift could be real, a special cause and not just allowing natural...

Naturally, the process does not move one-and-a-half standard deviation

0:18:53.0 Mustafa: all of a sudden because there are tests on control charts that if the process... For shift. So, if the process, for example, gives you nine points in a row on one side of the center line, that's a flag because that's a shift. That's a shift in the process. Now the process shifted on you, and you're not reacting. You're not doing anything about it, so you have to stop and take a look at it. So, what Six Sigma is saying is, "Yeah, the process could shift one-and-a-half standard deviation." But in statistical process control terms, it can't without reacting to it.

0:19:37.5 Andrew: And a simple control chart, or run chart, will probably reveal this better than looking at a histogram type of chart, like a Six Sigma type of chart where you're observing the output of the system moment by moment. Would that be correct to say?

0:19:56.5 Mustafa: Right, right. So, the control chart... And I did a paper... And there are people that are out there and doing the same thing. I did a paper and showed that if you move the system one-and-a-half standard deviation, you will see all these points beyond the control limits by simulation, simulation of the process. You move it, and you'll start observing so many points being out of the control. And so, if you allow it, then all of a sudden you start seeing all these points beyond the control. And what do you do? So, there is nothing to cover that within the Six Sigma body of knowledge.

0:20:40.7 Andrew: And maybe it's a good point just to talk briefly about the control charts and what Dr. Deming taught about that. I think when I started seeing the control charts as he was describing them, I started to see a real intense focus on looking at... at trying to understand what's really happening with this system and trying to observe it in real-time. And the more that you did that, the more you really start to understand what's driving the performance of that system. So, maybe could you just take a moment, think about the listener or the viewer that doesn't understand the control charts yet, maybe just give a big picture about what those are, and what's the value of them?

0:21:27.7 Mustafa: So, the control chart is basically... If you think about plotting points over time, that would be a run chart. So, just looking at your performance over time and just plotting points, that's a run chart. A control chart is basically taking the run chart and creating control limits on it. And the control limits came from Dr. Shewhart who invented the control charts. And he put those control limits to minimize a couple of mistakes: not reacting enough when you have to, and not over-reacting when you see something. They were more economics. They were not statistical in nature. They don't really depend on statistical distribution or anything like that. They are very robust. They can be used in a variety of applications without having to look at the distribution of the data. And they tell you when to react to a special cause and when to leave the process alone.

0:22:41.3 Mustafa: So, when you leave the process alone, it means that you have common cause variation, just the systemic type of variation that occurs over time. But that doesn't mean that you don't work on it as management. This is a management part of the work. So, when you have a stable process, it means that this is a time for management to initiate, maybe, continuous improvement project or initiative to reduce that variation, and not... Because you can be stable and in control, but you still have a lot of variation in the process. So, the spread is very wide in the process or, in the control chart, it will be going all over with a lot of variation, but it's still within the control limits. It

could have this kind of scenario. And that's when management has to step in and say, "Okay, we need to look at this from a big picture and try to look at all the causes and do some kind of continual improvement."

0:23:53.3 Andrew: Mustafa, I would think that when you look at it, it turns out that it's like a continuous experiment. And you're looking at the outcome in a control chart, and you're trying to think, "Okay, if we... " Let's just say that we add a new piece of machinery. We upgrade a particular part. Then we look and say, "Okay, how did that impact the output of the process?" And then you start to see that what you're talking about, and I think what Dr. Deming is talking about was the idea that, start to get this intense focus on how do we improve this process? And how do we reduce that variation to a point? There's no point in reducing it beyond a certain point. But just that focus. Whereas with Six Sigma, it's kind of a theoretical thing, and there's other aspects that you've talked about. But just that, a control chart really allows you just to focus on testing and understanding that the whole... The output is a function, not only of the people on the production line. Let's say if it's in a factory, and it's the machinery, it's the way you organize, it's the shifts that you work. It's all of these things. So, I can't help but think that it's kind of like the fun of testing and seeing the result coming out of it.

0:25:09.1 Mustafa: Right. When you say a special cause, it doesn't mean always that it's bad. It could be good. But you have to study it, and you have to see what happened. So, was it intentional? Was it unintentional? But at least you would stop and look and study. And that's the idea. It's not just to let it go without studying it. On the other hand, the common cause, you're just looking at the width of the variation in general. And you try to reduce that, like you just mentioned, over the long run.

0:25:42.0 Andrew: So... Go ahead.

0:25:44.8 Mustafa: No, I was just gonna go back to Dr. Deming before I move to Dr. Deming's chain reaction model. I use that all the time. I use it when I was doing workshops in industry, and I use it now in my classes. And I put that... The chain reaction model. And what the chain reaction model for those of the listeners who are not familiar with it, Dr. Deming says that, "You have to start with improving quality, and the rest is just a chain reaction." So what happens is, when you improve quality, and that is, and what he's talking about here, is a commitment by management to quality. It's not just a one-time improvement of quality, it's a commitment on improving quality. Then you start seeing defect decreasing. You start utilizing equipment better. Errors decrease and all of this becomes much less. Your productivity, as a result, goes up because the cost is down, or your input cost is down so now your output is better, and you have a good productivity which keeps you in business, and you provide better jobs to your community. I think...

0:27:18.8 Andrew: That topic is so interesting because I think most people, at the time of Dr. Deming and even now, think quality is a department; quality is something we apply in a certain area. And when you think about setting the purpose of a company to improve quality, it's a very risky thing. Most people think, "No way. Our company is about sales. Our company is about profit. Our company is about customer satisfaction," or whatever that is. Those things all are the intuitive things that we come up with to say, "That's what drives our business." And Dr. Deming, what you're saying is that... Dr. Deming says, actually, the chain reaction that starts from quality leads to all of those things. Can you elaborate a little bit more on that?

0:28:07.5 Mustafa: Right. So, we know that we have to start on quality. But take, for example, companies that are engaged in Lean projects. So, what they do in Lean projects, you try to eliminate waste. And eliminating waste could also be a risky business if you just arbitrarily start cutting costs of material, of employee hours, or eliminating jobs, for example. If you take it from the productivity block of the chain reaction model, you go nowhere. You gotta go back from the quality, improving quality, and that's where the chain reaction starts. But for many Lean projects, they actually start from the productivity block. So, improve productivity from the productivity block, that doesn't really work because you are not committed to quality at that point. So, what happens is, you start maybe buying cheaper material or eliminating jobs. That might help you in the short run. The short run may be the next quarter. It's going to help you out. You're gonna improve the bottomline. Later on, all of this is going to come back as customer complaints, returns, issues with employees, lack of motivation because now they have to do more with less hours, and so on and so forth. But it creates a whole set of problems that are addressed in the system of profound knowledge from the psychology part to the learning part, and knowledge and the PDSA.

0:30:00.4 Andrew: So, let's go back to then now. I wanna talk about the system of profound knowledge so that the listeners out there, some of them understand it very well, but some of them may not understand what that means at all. So, now we've kind of been through a little bit about Lean. We've been through Six Sigma. We talked a little bit about the 14 points, and I think the point that you're just making is that when you look at Dr. Deming's 14 point, first one is create constancy of purpose. The second one is to adopt a new philosophy, and the third one is to end dependence on quality inspections. It's like those top three are telling the senior management, "Your job is to improve quality." That is what's going to lead this chain reaction. And I think you've illustrated that in your discussion really well. So, take a moment and tell us about system of profound knowledge as you see it.

0:30:49.8 Mustafa: Okay. So, the system of profound knowledge is... There are four pillars or four components to it. And the first one is appreciation for a system, meaning that you have to see systems in place. You have to do a connection of different parts together, that you cannot do things in silos. You cannot suboptimize. You have to look at the aim of the system, and you try to work for the aim of the system, not the aim of each department. But with that comes the idea of creating the variation part, and what is systemic variation and what is a special cause variation? Systemic variation is a part of management's decisions. They have to make improvement on that in the long term. And how you react to variation. So, if the system has a certain capability, and then you ask somebody, "Okay, I want you to get me that which is up here, way up. That's your objective." If the system is not capable, what is the employee going to do? They're going to try to create that number to please the boss. As Dr. Deming was referring to, they tried to please their manager or the boss. So, you might take risky steps to do that, including maybe fudging numbers or coming up with ideas to create that number.

0:32:37.1 Mustafa: And that goes to psychology, so now you are... You don't feel good about it. You have to keep your job. You have to do all kinds of stuff to make sure that you don't lose your job because you could not achieve that. Now you become less motivated. You're not really engaged. And what happens? They provide you with incentives, outside incentives. Bonus is based on work that you have to do, but the system is incapable. You cannot perform beyond what the system is capable of. So, that creates all kinds of problems. And the last part is the learning part or theory of

knowledge, and that you have to have a method. You have to have clear definitions and, basically, you have to know what you need to accomplish, and by what method and how you know when you get there. That's a theory of knowledge. There is no knowledge without a theory, and it has to be... It has a temporal element in it, meaning that you revise the theory, and you create more knowledge. So, that's in a nutshell how you... How all of these components are related to each other. But to me, the systems and variation, they're just out there, and I see it everywhere as a problem.

0:34:14.3 Andrew: Yeah. So, to summarize, the system of profound knowledge, as you've explained, is appreciation for a system. Number two is knowledge of variation, number three is a theory of knowledge, and number four is psychology. And one of the things that I came to learn about Dr. Deming is, I always say he's a humanist. He's a person that really sees that people should have joy in work, and he wants to see people reach their full potential, and he understood the powers of incentives like you just explained. So, now that we understand a little bit of the theory of the system of profound knowledge, what is going wrong out there in this world? Let's talk just briefly about, why is this so significant? Come on, I just go get my black belt in Lean Six Sigma and the problems will be solved, but what is it about the theory of profound knowledge that... Or the system of profound knowledge that people should pay attention to now?

0:35:21.5 Mustafa: Well, with... For example, let me just take it from a different perspective. If you look at Lean projects, and you eliminate. for example, waste. if you don't have a system of profound knowledge to check all of the things that needs to be checked, like variation and psychology and making sure that people are not fearful to do their job, then you're creating other problems, not only just... You're not just reducing waste, you are actually, maybe having... overburdening the employees with removing waste because when you remove waste, you may be removing jobs, you may be removing hours, you may be removing employees. That would create a overburden. You could also create problems for the customers and fluctuation and defects and variation.

0:36:21.8 Mustafa: That's why the system of profound knowledge is an integrated system. It's not a just one piece. Once you start going from one door, you gotta address all the other components that are tied together to it. So to me, from whatever door you go in in the system of profound knowledge, let's say you go from the psychology which is you drive out fear. You create a good climate. You do all of these things, then you start seeing people coming up with innovations, reducing variation, and working together collaboratively which creates a good system. So, whatever door you go in, you're going to get to it because they are connected. There is no way that you're not going to address the other points if you have knowledge about the other points.

0:37:15.0 Andrew: It's an interesting thing that I would say in modern management, in modern life, people are trying to compartmentalize things and thinking that being a specialist in a particular area, whether that's medicine or whatever in business, that by compartmentalizing, it gives us comfort that we can become an expert in this area and all that. But what you can see... And I'll tell you, Mustafa, about my mother who I take care of. She's 83. And if we have a problem with her foot, the doctor may say, "Okay, don't walk for a little while." Well, that causes another problem. You start to risk bedsores. You start to have problems with GI system. And what you find nowadays in medicine is it's getting more and more narrow where doctors are not seeing the holistic pieces, and I see myself always constantly thinking about the whole picture to that. And I think what I'm hearing from you is that, that we should be looking at things more holistically, and that's what the system of

profound knowledge is teaching, is that... Would you say that?

0:38:24.1 Mustafa: That's exactly right. That's exactly right. So, you have to... The main thing there is, companies, traditionally, they try to just suboptimize through their management by objective, "We want each department to save so much money," and then, once they start doing that, everybody affects the other negatively, but they don't know until later on that they have done that. You might gain the objectives in the short run, but in the long run, it's going to be disastrous for the aim of the organization.

0:39:03.9 Andrew: So, you just raised another point that Dr. Deming teaches about is suboptimization. And what he tried to teach was that the objective of the senior management of the company is to optimize the system, not its component parts. Have you seen...

0:39:19.9 Mustafa: Right.

0:39:20.9 Andrew: In theory, people should know that, but how is that going wrong in this world these days? And why is it important to be thinking in this holistic way that Dr. Deming was teaching?

0:39:32.5 Mustafa: Because companies, if they don't do things systematically, and they don't apply the whole system of profound knowledge, altogether, they're going to rush into money-saving exercises, and those money-saving exercises could be replacing material with lower-grade material. It could be, maybe, not hiring experts and hiring somebody who doesn't know what they're doing, and not providing training, or cutting training, or foregoing maintenance. There are so many things that you can start focusing on because you have issues. So, you have issues with a customer, and you start focusing on cutting costs, arbitrarily, not with a method, arbitrarily starting cutting costs in different departments. When you put it all together, just things don't merge well together because you're trying to suboptimize. You're trying to lower the cost in each department and not really improve the aim, or attain the aim of the organization as a whole.

0:40:48.3 Andrew: We've covered so many different topics. It's pretty exciting, like this sub-optimization. I think is a really interesting one. And I wanna raise a new topic that is the opposite of one of the topics that you raised. You talked about the chain reaction. Let's talk about the opposite chain reaction. I'll tell you a story in my own coffee business. We had put some pressure on some of the people in the procurement part of the business to reduce cost. That's reasonable. Management wants to reduce cost so there we go. We put pressure on them, and we told them... We incentivized them. And what we saw was that they ended up proposing a lower quality coffee bean, green coffee bean. The production people didn't like it because all of a sudden they had to recalibrate the machines. So, there was already a cost right there because the... It was harder to hit the client's demand of what taste that they want, consistently hit it.

0:41:47.9 Andrew: Then the people that were delivering, when we delivered the product to the customer, we had some returns where the customer is like, "No, I don't like this taste," or that we would have much more variability. And all of a sudden, we had customer complaints. And then we started to realize that, "Okay, now we gotta go and replace that with the proper stuff," and then all of a sudden there was all kinds of cost. So, the chain reaction you talked about was, start with quality and you start to reduce costs throughout the chain. And a reverse chain reaction is when you

start by trying to optimize one point and not realize that it's a whole system, and therefore what you've caused is a negative chain reaction of cost just when you thought you were cutting costs, you're actually raising costs.

0:42:33.7 Mustafa: Right. That is a great example of that because what you've done is maybe just looking at the productivity part, you wanted to make sure that the costs were down so trying to turn the knobs on certain things, and then it just backfired on the quality part, increasing errors, increasing customer dissatisfaction and all of that, and that happens all the time.

0:43:01.4 Andrew: And that's what Dr. Deming says, "How can you measure the cost of a lost customer? How can you measure the dissatisfaction and the frustration?" Some things are just unmeasurable. So, I wanna...

0:43:15.2 Mustafa: Right. So, that brings about the issue of visible figures. You're managed by visible figures only, and not really the stuff that are behind the total cost, which some of it is unknowable or unknown.

0:43:34.2 Andrew: Now, Professor, this is really strange. Here we are, talking about quality. You're such an expert in all of these statistical methods, and now you're saying, "Wait a minute, you can't just measure by visible figures." So, this is again a paradox of Dr. Deming where you come into his teaching, seeing all of these numbers and all that, and now what you're telling me is it's not just visible figures. Could you just elaborate on that?

0:44:02.7 Mustafa: Yeah, absolutely. Visible figures are figures that are available right there for you, and you just react to it. If things go up, you wanna reduce costs. You just take action. But visible figures are really a limited part of the whole story because the total cost of not doing things right or not following the Deming management method. They're not going to be... You're not gonna see them until later on. You may be able save for a quarter or two but, beyond that, things are going to start accumulating in terms of defects, returns, and things of that nature. So, from the Deming point of view, the visible figures are only a smaller portion of the total figures which cannot be measured at the time you're looking at the numbers and taking action.

0:45:04.3 Andrew: It's interesting because we hear sayings like, "What gets measured gets managed," and those types of sayings. And one of the things that I... When I teach young people about this, I oftentimes say, "Well, let's just look at a simple thing. What is the value of a hug? Measure it." It's immeasurable. Particularly, in a particular situation when someone is traumatized, or in a really painful situation, and that hug made a huge difference in their life that could actually have kept them alive and led them to another so that... I think that's the visible figures that you're raising. It's such a small part of this world. The bigger part is how it all fits together. And so, I think you really inspire me to rethink about this concept; that it's way beyond just visible figures.

0:46:03.5 Mustafa: Absolutely, absolutely. This thing is just... One of the things that really captured me with the Deming philosophy is visible versus invisible figures, and the sub-optimization part versus the aim of the system. And those things are just so powerful when you think about them, when you think about why we're promoting, or why we're talking about Deming, and why now and all of that. It's these things that are very common these days. And they have... To have a good system, to have good management, you have to eliminate management by visible

figures on... You still have to have visible figures, but visible figures-only is what Deming is... What it was Deming opposing. What he was against, I guess.

0:46:57.8 Andrew: Yup. And you said, "Why Deming? Why now?" And I'm thinking about it myself. And my answer to that is that we have a whole generation of young people who think that successful management is, maybe, sitting at their desk behind a computer looking at KPIs. And then, when someone is down on their KPI, send them an email, kick their butt. And when someone is up on a KPI, give them a bonus, and that's it. And then you go home at the end of the day. And they're so lacking in the psychology aspect of the system of profound knowledge, but just in what management truly is. So, from my perspective, "Why Deming? Why now?" is because we have the risk of it turning into some kind of automation system of management that will always end up underperforming. Why would you say, "Why Deming? Why now?"

0:48:00.5 Mustafa: So, as you can see that, for me, "Why Deming? Why now?" is I don't see management using variation as a way to distinguish between the common cause and special cause, and also their reaction to it, or the mistakes that they make as a part of it. So, that's a big thing. The other thing is the fear that people are experiencing at the workplace. Recently, we've heard about the great resignation. People just don't wanna go back to work anymore. And a lot of people expressed that they just don't like the environment that they work in. And we know that most people, about 70% of people who quit, they don't quit because of a pay or anything like that. It's because of relationship with their bosses and the company, and they just don't feel that. So that the environment has a fear in it. So, when you create fear, you're not going to have people that contribute and collaborate, and I think that's big. If we learn anything from this whole pandemic, it is that you have to create an environment of trust because if people are away working virtually or work in the office, you shouldn't have to worry about them if you have created that environment or the trust.

0:49:34.6 Andrew: Yup. And you mentioned about the pandemic. If there's one thing we've learned, fear is a massive motivator. The level of things that people have gone through in a state of fear, things that people would have never imagined that they would have done. And so, I think what you're talking about is just one more of the many Deming principles, which is to drive out fear. And I just wanna summarize some of what we've gone through, and then we'll wrap up. So, we've talked about the differences between Lean and Six Sigma and Lean Six Sigma. We've talked about Deming's 14 points. We've talked about the system of profound knowledge. We've talked about optimizing versus sub-optimizing. We've talked about the chain reaction, and I gave the example of a reverse chain reaction. And then, we talked about visible figures and understanding that there's much more than that, which is such a paradox for me when I first started learning Deming's teaching because I thought I was gonna take comfort in those numbers and the visible figures, but he told me, "No, no, no. There's much more." And finally, we talk about fear. Is there anything else that you would add to this final wrap-up of the conversation?

0:50:52.3 Mustafa: So, we started talking about Lean and Six Sigma and... Six Sigma is a continuous improvement process, but you don't really need to use it to... You can use the Plan-Do-Study-Act to it. There is no problem if you use it, and you recognize what's wrong with it, and you try to fix it. There's no problem with that. But, I think the Plan-Do-Study-Act and the theory of knowledge is sufficient for you to start working on things. But, like I mentioned, some companies, they like the titles and the tags and the big investment because then they use that as a motivator to

get people to start working on projects to bring money back, to save the company the money that was spent on them. So, that's the only thing I wanted to add is just like you can't just rely on something that is big. The Plan-Do-Study-Act was good enough, and I think it's good for any organization. The problem with applying the Plan-Do-Study Act is that you have to have management's commitment because remember, when you do Six Sigma, you're basically outsourcing your quality to an external source, providing the training, the titles and all of that. You can cut it off any time. But when you do the theory of knowledge and the Plan-Do-Study-Act, you have to commit. The commitment is really the big deal here, or the component that is missing is a commitment to quality.

0:52:44.9 Andrew: Well, in wrapping this up, I wanna come back to where we started. Where we started was you were a young master's student and coming out of studying about these tools of statistical methods and all of that stuff, and you entered into our conversation, and you entered into the introduction to Dr. Deming through these tools. But here we are at the end of this interview, and now you're talking about such much bigger issues, and I think, for me, that inspires me about what Dr. Deming has taught because it is expansive. And the more you study it, the more you see it's way beyond just tools. So, Mustafa, on behalf of everyone at The Deming Institute, I wanna thank you again for coming on the show and sharing your experience with Dr. Deming's teachings. Do you have any parting words for the audience?

0:53:41.5 Mustafa: All I have to say, you gotta get started somewhere, and the system of profound knowledge is it. So, I would definitely recommend... I have been through many of the seminars that the Institute offers, and I would highly recommend that and also getting Dr. Deming's book "The New Economics." That's a good start. Of course, the follow-up is also just as important and continuing with the journey.

0:54:15.7 Andrew: Well, great advice. Get "The New Economics;" read it. It really sums up a lot of Dr. Deming's teachings. He put it together right at the end of his life. And that concludes another great discussion within our worldwide Deming community. Remember to go to deming.org to continue your journey. This is your host, Andrew Stotz, and I will leave you with one of my favorite quotes from Dr. Deming, "People are entitled to joy in work."