

LOW PHYSICAL EFFORT

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Abstract

As the world becomes smaller and connected, the relevance of principles of Universal Design keeps becoming more relevant and pertinent. Exclusivity has become a luxury while inclusivity has become a necessity. This paper tried to broadly examine one of the important pillars of universal design known as "Low physical effort". "Low physical effort" is often wrongly linked with induced laziness while falsely assuming an 'abundance' of time. This paper helps in highlighting the importance of working smartly to reduce physical effort to save time and energy so that it can be invested effectively. The paper also proposes approaches and techniques using examples from everyday life that could help reduce physical effort.

Key Words: *Less physical effort, physical effort, design driver, universal design, smart-work, inclusive design.*

1. Universal Design

Universal Design is a design approach where the outcome of the design caters to a wide range of users. Just because a design is accessible to a large mass doesn't mean that it is Universal. A design is universal when it can adapt users of different categories as if they seem like they were designed solely for that particular user. This adaptability in design requires some use of constraints and aiding elements to function as desired. Low physical effort is one of the 7 principles of the Universal Design approach that could help achieve this adaptability.

2. Low Physical Effort

Low physical effort is a design driver in Universal design which becomes the core idea behind the

seed of every design in the present world. Design means to bring some improvement in an existing solution for a problem or finding a solution for one which hasn't been solved yet. When we go out in the market to buy some product to replace a product currently existing with us, our primary criteria might be the ease with which the new replacement could get the job done. It's an innate urge with humans or intelligent species to achieve better results day after day. If our ancestors had stopped thinking of bettering themselves and the environment they lived in, the world wouldn't have progressed. All the inventions, products, services, etc. we see today are the present link of a chain reaction of thought and design started by someone in the past (Zheng, 2021).

2.1 Laziness Drives Inventions

It is quite impossible to pinpoint how humans started inventing things. The first few inventions must have been accidental discoveries rather than well-thought-out ideas. But once we discovered that certain things can make our lives easier, we must have started thinking about what other things could make it even better. It is human curiosity and laziness in human nature that formed the driving force behind this. Mr. Bill Gates once said, "I will always choose a lazy person to do a difficult job because a lazy person will find an easy way to do it." Accidental discoveries which turned into useful inventions include fire, water transport, building shelter, etc. These accidental discoveries solved many problems we never knew existed. But once we got comfortable with the solutions, we urged to make them better and started identifying new problems.

2.2 Time and Effort

When we think of physical effort, we often overlook 'time'. Physical effort and time are directly proportional. The more effort you need to put in to accomplish a particular task, you would require more time accomplishing it. Human life is a race between birth and death. When humans realized this and understood the concept of time, it became the most valuable thing in our life. And the race between birth and death became the race against time. Every day we are striving hard to save time. One key to doing this is to reduce the physical effort in any known activities. It can be as simple as using a knife to cut vegetables than tearing them apart using our bare hands.

3. Why Reduce Effort?

There's always a priority matrix for a day's work for a person. We are not machines. Time as I mentioned earlier is extremely precious as we are not eternal. So as per this priority matrix, different people will have different preferences. None of us would want to waste time on menial

tasks postponing the important ones in our life. But some menial tasks are unavoidable. Let's think about a very simple example we all can relate to. We all need to eat to survive right? And most of us prefer home-cooked meals. But not everyone enjoys the process of cooking. For such people, it becomes a menial task. Most of us don't like doing dishes after a wonderful dinner. A dishwasher can take this boring chore away from us and save us some time and energy. A dishwasher might be a complex example here. Something not everyone can relate to, but no one would have missed the TV commercial about dishwashing soaps. In the ad, they clean a soiled pan with just a single wipe of sponge with their product. It's been the advertisement formula for so long, but it is still very tempting, right? Why is that? Because we know the hardship of scrubbing such a dish. All it reduces is the number of moves we require to scrub. It saves time, and energy. That makes it a better design at least in theory (products are often misrepresented in ads, and that's the topic for a whole another discussion).

National Center for Biotechnology Information (2021) suggests, in simpler terms, that we need to reduce the physical effort to: -

- Save time
- Save energy
- For better allocation of effort to something more important

3.1 How Effort Is Reduced

Physical effort is the usage of our body's energy over a period of time to get something done. It might not always be a muscular effort. For example, reading is a physical effort where the muscle has very little to do with. So, to reduce physical effort, we have got two choices. Either reduce the energy requirement or reduce the time consumed by the task. This can be achieved by the assistance of an external appliance for the same task or by simplifying the task itself. There is always a balance point between these. A good design is about finding that balance point. But a reduced physical effort or improved time savings may not always result in an overall reduction in the effort as people tend to get more work done as result. This can be the flipside of the coin but not necessarily a bad side to having.

3.2 Reduce Physical Effort Doesn't Always Result in Reduced Physical Effort

For example, imagine you are driving a screw to a wooden plank. Scenario 1: with your bare hands. There is only a certain amount of force you can exert to rotate the screw. Still, you might not be able to accomplish the task. Scenario 2: with a screwdriver. The amount of force you can

exert remains the same, and you might even be using the same amount of force to rotate the screwdriver. But this time the screw drives in without much hassle. So, what really happened here? If you were using the same amount of force in both scenarios, why were you not able to drive the screw with bare hands? The screwdriver here helps you concentrate the force you applied the exact way it requires to drive a screw. So, what did we achieve here? Sometimes reduced physical effort can help us do otherwise impossible things.

4. How Do We Achieve "Reduced Physical Effort"?

While designing any product, we should be well aware of the use case of the particular products. We should consider every possible user who might use our product. We aim to attain a universal design. The key to achieving this is to make our design as inclusive as possible. An extensive user study is required. The design should be able to be used efficiently and comfortably and with a minimum of fatigue.

Reduced physical effort can be achieved by performing the following:

1. Allow the user to maintain a neutral body position.
2. Use reasonable operating forces.
3. Minimize repetitive actions.
4. Minimize sustained physical effort.

4.1 Including Everyone In The Process

Low physical effort not only makes it easier for an average person but also makes it accessible for differently-abled people across the globe. Let's go through a simple example. We may not first associate physical efforts with using the web. Anyone can easily just sit down and use a mouse, but technology is now integrated and ubiquitous in workplaces. Many people are using their computers for eight or more hours to perform tasks at work. The amount of time we spend on our computers is taxing on our bodies. In fact, people with physical disabilities have even more difficulty with using the web than normal users do. For example, those with mobility issues may have a hard time moving the mouse to the desired target. This is why designing for low physical efforts is vital to bear in mind whenever we work (Smith, 2013; Ranahan, 2017).

5. Low Physical Effort Is Non-Negotiable

There are multiple reasons the world is calling universal designs. Inclusivity is the key in the 21st century. All major countries in the world call for equality and equity. In order to practice these,

everything should be accessible to everyone. Also, in the era of mass production, there is very stringent competition between manufacturers or service providers to attract a maximum customer base. The price of a product/service is inversely proportional to the number of products reaching the market. Major players are running on a thin profit margin. They can't afford to produce exclusive products. Every product should overlook gender, class, ability/disability to become affordable to the masses. It's not just about the multinational giants making a profit out of their products. It's about accessibility and affordability too. Exclusive products are now termed designer/artisan products. So, like every 'Universal design driver', 'Low physical effort' is non-negotiable too. No designer can ignore it.

5.1 Low Physical Effort Is Not Always Desired

It's all about balance. Our body needs to be punished a little to stay healthy. We have heard a lot from our grandparents saying "people got addicted to technology these days, and that's the reason for every disease in the world now." Even if we catch a common cold our mobile phone would be the culprit. But yes, our body requires some workouts. Does that mean the designs calling for lesser physical effort are not good? Imagine this. Instead of carrying big boxes on your head around a warehouse, you use a forklift, get the job done and save some time. You might be able to complete 8 hours of physical work in 1 hour with the help of the right tool, saving 7 hours, and later use 1 or 2 hours out of it to work your body out at a gym to stay in shape. You're still saving 5-6 hours. You get more work done, save lots of time and balance the equation by working out. So, no! designs calling for lesser physical effort are not bad (National Centre for Biotechnology Information, 2009; Better health channel, 2020).

6. Conclusion

Low physical effort was the key behind inventions and it was the driving force of designs since the history of humankind. Once a reason for design has now become the backbone of the philosophy "Universal Design". Universal design is much more than what meets the eye. It's a movement towards a better world with humanity and equality celebrated over exclusivity. It's not just about physical effort. Any physical effort from our end requires a lot of processing inside our brain. Brain exhaustion is real. The human mind is a priceless thing. As of now, there's no true replacement for it. We should be using our mind for something great than spending it on menial tasks. So, every time you reduce physical effort, you're freeing up your mind to think of something great.

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