

# The fifth rule of “design with discourse” for the orthogonal representation of moral concerns in design from the ethics level

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## Introduction

The current version of the hierarchical representation of artifacts we have introduced [Sekiguchi 10] is not necessarily suitable to directly express self interests of the designer. For example, when I design artifacts from the ethics level, values such as to make me happier, to make my significant persons happier, and to make me earn a lot of money can hardly appear in the hierarchical representation of artifacts. Therefore, we are not supposed to investigate whether or not the designer’s morals is just, though there is a system to investigate whether or not the design is ethical which means valuable for the whole world. It has not been a problem so far, because moral concerns are not indispensable for the designed artifacts themselves and they were considered to be “secondary” ([Sekiguchi 10] p. 6) for the framework of design from the ethics level. As a result, we have permitted ourselves to secretly ignore moral concerns even if we become aware of them.

But it became a problem now because it was figured out that to force a designer to secretly ignore moral concerns must make him or her confuse. To design artifacts more clearly, the confusion must be removed.

Then, one probable solution is a way to express the ignored information systematically, because it will allow the designer to manage moral concerns intentionally and practice better design from the ethics level. Moreover, to express moral concerns can be useful for others. For example, it may help others understand and evaluate the design more clearly.

This is the reason we will introduce what is called “orthogonal representation of moral concerns” and “the fifth rule of design with discourse.” They

will make it more systematic to manage moral concerns in designing from the ethics level. For example, they will allow us to make the representation of moral concerns separate from the hierarchical representation of artifacts clearly, and its orthogonal character will allow us to describe relations between the concerns and the corresponding level directly without crossing over other levels. In this paper, we will confirm these points with three cases to which I applied the new representation and the method. Then, I think there are a lot of great investigations concerning what we signify as “morals” of engineers such as Caroline Whitbeck’s work [Whitbeck 98], so that I would like to offer this paper as an essay which investigates the orthogonal relation between the direction of the morals and the direction of design from the ethics level.

In this paper, first, I will describe further why the hierarchical representation of artifacts is not suitable to express moral concerns of the designer. Second, the orthogonal representation of moral concerns will be introduced. Third, the fifth rule of design with discourse will be introduced. Fourth, three cases will be described. Fifth, with these cases, I will evaluate our expectations. Then, some related philosophy and ideas of our future work will be described. Finally, I will conclude that to provide a way to systematically express moral concerns allows us to practice design from the ethics level more clearly than ever.

## **i Why the hierarchical representation of artifacts is not suitable for expressing moral concerns**

First, to design from the ethics level, we have introduced the hierarchical representation of artifacts. Figure 1 shows an overview of the hierarchical representation of artifacts ([Sekiguchi 10] p. 11) and two directions of it.

As Figure 1 shows, the vertical direction of it corresponds to the direction of levels, and the horizontal broadness corresponds to the comprehensiveness of design solutions.

The point is that this hierarchical representation of artifacts tends to make us confuse about moral concerns and secretly ignore them in designing from the ethics level. The reason is composed of two points following:

1. The direction to express moral concerns seems to be different from the direction to make the world a better place.
2. There is no level corresponding to express moral concerns in the hierarchical representation of artifacts.

First, the hierarchical representation of artifacts makes it difficult to de-

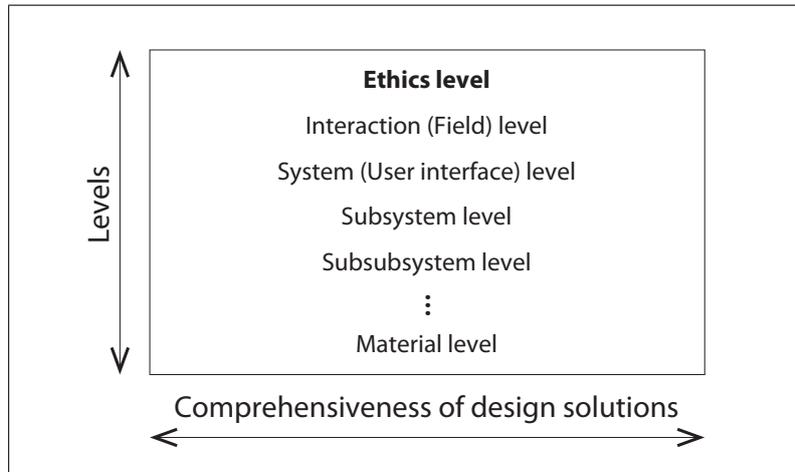


Figure 1: An overview of the hierarchical representation of artifacts.

scribe moral concerns because they seem to be different from the values to make the world a better place. In this relation, it is significant to consider that the final purpose of the hierarchical representation of artifacts is to make the world a better place, whereas that of moral concerns is to make the designer himself or herself be a better person or live a better life. They are both significant for the designer himself or herself but there is only the direction to make the world a better place in the framework.

Second, the hierarchical representation of artifacts makes us hesitate to describe moral concerns because there is no level corresponding to moral concerns. If there was such a level, it would enhance us to express them. But, unfortunately, there is not. The ethics level is not the level because ethics at the ethics level is not of the designer but of the whole world whose scale is far larger than a person. Moreover, the interaction level exists between the ethics level and the system level. Interactions at the interaction level does not relate the designer himself or herself, because the interactions are what emerge in the field where designed artifacts and users interact, and the designer is not the users in many cases. Then, all the lower levels are of designed artifacts such as the system level and the subsystem level. As a result, there is no level to describe moral concerns.

In short, because there is no place to express them, it often makes us confuse how to manage them and, in the end, secretly ignore them in designing from the ethics level. In this paper, we would like to offer a solution for this problem.

## ii Introducing two new fields for the orthogonal representation of moral concerns

First of all, we would like to introduce the orthogonal representation of moral concerns. To practice it, we are supposed to use three fields including a field for the hierarchical representation of artifacts. Figure 2 shows an overview of the three fields for the orthogonal representation of moral concerns.

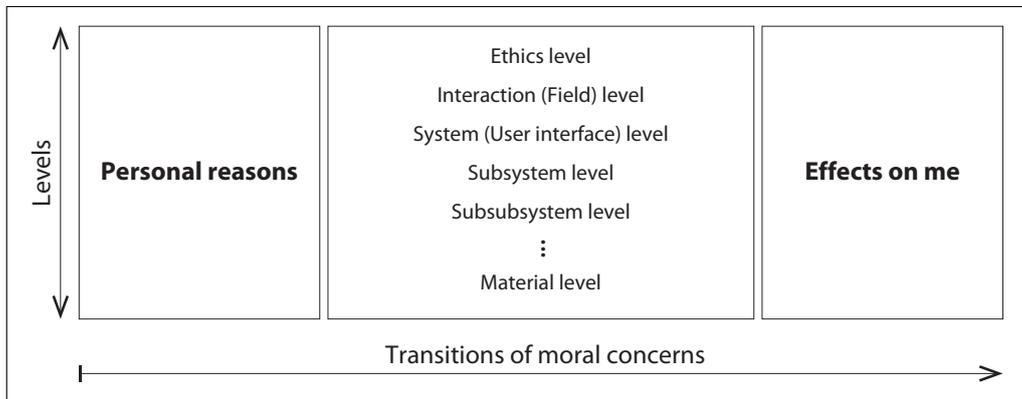


Figure 2: An overview of three fields for the orthogonal representation of moral concerns of the designer: a field for expressing personal reasons, a field for the hierarchical representation of artifacts and a field for expressing effects on me.

As Figure 2 shows, the orthogonal representation of moral concerns has two additional fields positioned on both sides of the hierarchical representation of artifacts: a field for expressing personal reasons and a field for expressing effects on me. For example, as the personal reasons, such as “because I followed my passion” and “because I followed suggestions from one of my superior officers” can be described, and, as the effects on me, such as “I will change to feel a sense of achievement” and “I will change to be promoted” can be described. And it is also permitted to describe the personal reasons and the effects not only concerning me but also concerning us, for example, our community.

The point is that the three fields are separated from one another, and positioned temporally and orthogonally to the levels of the hierarchical representation of artifacts. These characters are significant because of the three points following:

1. To get the three fields allows us to clearly understand that there are three kinds of representation.

2. The temporal arrangement allows us to clearly describe the transitions of moral concerns.
3. The orthogonal position allows us to express moral concerns directly to every level.

As to the first point, it is useful to clearly understand that the direction of moral concerns is originally different from that of design from the ethics level. It is because our aim is to manage moral concerns systematically in design from the ethics level. And it is also useful to separate the representation of personal reasons from the representation of effects on me. It is because their roles in design are different. For example, others can edit the effects on me but can not edit personal reasons of the designer. Furthermore, if we can get the understanding, we will be free from the confusion of the two directions in design from the ethics level and the secret ignorance of the moral concerns. And it is also expected that to deal with the moral concerns clearly are useful not only to make the designer be a better person and live a better life, but also to make the design be a better one.

Then, as to the second point, the horizontal direction from the left to the right corresponds to the direction of the transitions of moral concerns. It means that personal reasons can be the cause of a design solution, and the design solution can be the cause of effects on me. Moral concerns become temporal in the three fields. And to describe the transitions between the three fields is what we call the orthogonal representation of artifacts.

Finally, as to the third point, a designer can have moral concerns at every level in the hierarchical representation of artifacts. For example, to make new materials and to make the world a better place can be interesting for a designer equally. The orthogonal position allows us to describe these interests directly to every level.

In conclusion, the orthogonal representation of moral concerns is expected to be useful because it satisfies the three points at the same time. We will evaluate this point with three cases in Chapter v.

### **iii Introducing the fifth rule of design with discourse for expressing moral concerns of the designer**

Now that we have upgraded our framework with the orthogonal representation of moral concerns, what we need next is a method to express moral concerns of the designer. And our solution is “the fifth rule of design with discourse.”

First of all, we will review what design with discourse is. It is a method

to design artifacts from the ethics level whose lexicon and grammar is defined corresponding to the higher levels. As to the grammar, the original version of design with discourse is composed of four rules following ([Sekiguchi 10] p. 19):

1. To use grammar and terms clearly
2. To position your design in existing contexts
3. To apply the hermeneutic grammar
4. To describe “ if A is changed to B at the parameter level, then C will change to D at the target level”

And, as to the fourth rule, it is useful to visualize the description as Figure 3 ([Sekiguchi 10] p. 31):

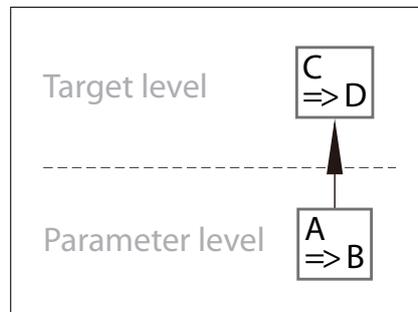


Figure 3: An image of boxes and an arrow that describe “if A is changed to B at the parameter level, then C will change to D at the target level” ([Sekiguchi 10] p. 31)

Then, the fifth rule we will introduce is:

5. To describe, “because A as a personal reason, I design that B will change to C in the hierarchical representation of artifacts, then D will change to E as an effect on me”

Then, it is also useful to visualize the fifth rule. Figure 4 shows an image of a visualized description of the fifth rule.

The arrows to show the possibility of the causality of the fifth rule has a broken line as Figure 4, whereas the arrow of the fourth rule has a straight line as Figure 3. It is to be distinguished from each other. The point is that the arrows of the fifth rule always direct to the right. It is because the three fields are lined up temporally from the left to the right, and the righter values corresponds to the higher purpose.

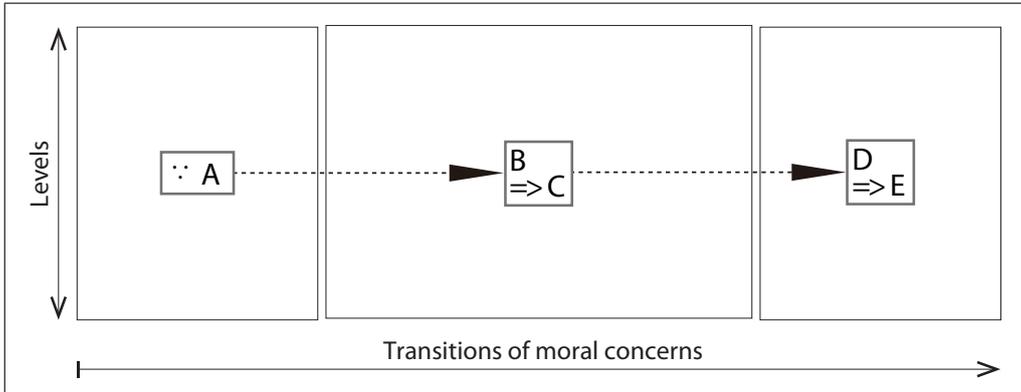


Figure 4: An image of a visualized description of the fifth rule of design with discourse.

With this fifth rule, we are supposed to express own moral concerns. One of the significant notes is that this is a fundamental form and we can modify it, for example, to extend the description of the relations of the changes. By the way, we do not need to use the ethical lexicon of design with discourse when we use the fifth rule. It is because we can describe personal reasons and effects on me with everyday lexicon, and do not need to design from them.

By the way, precisely speaking, we can consider the three fields three-dimensionally. The reason we have described them two-dimensionally is that it is more useful for the manual use. Here, we would like to introduce it as a supplement to understand theoretically. Figure 5 shows an image of the three-dimensional representation of design.

As Figure 5 shows, one direction corresponds to the levels of the hierarchical representation of artifacts, another corresponds to the transitions of moral concerns, and the other corresponds to the comprehensiveness of design solutions. And the plane for the hierarchical representation of artifacts exists between two bodies of the orthogonal representation of moral concerns. In other words, the plane for the hierarchical representation of artifacts is like the ham of a ham sandwich, and the two bodies of the orthogonal representation of moral concerns are like the two pieces of the bread of it. And the two fields for personal reasons and the effects on me are side views of the two bodies. We decided to set them on both sides of the hierarchical representation of artifacts as Figure 2 and Figure 4. It is because we have to describe the contents of the hierarchical representation of artifacts at the same time, and order them temporally as Figure 4.

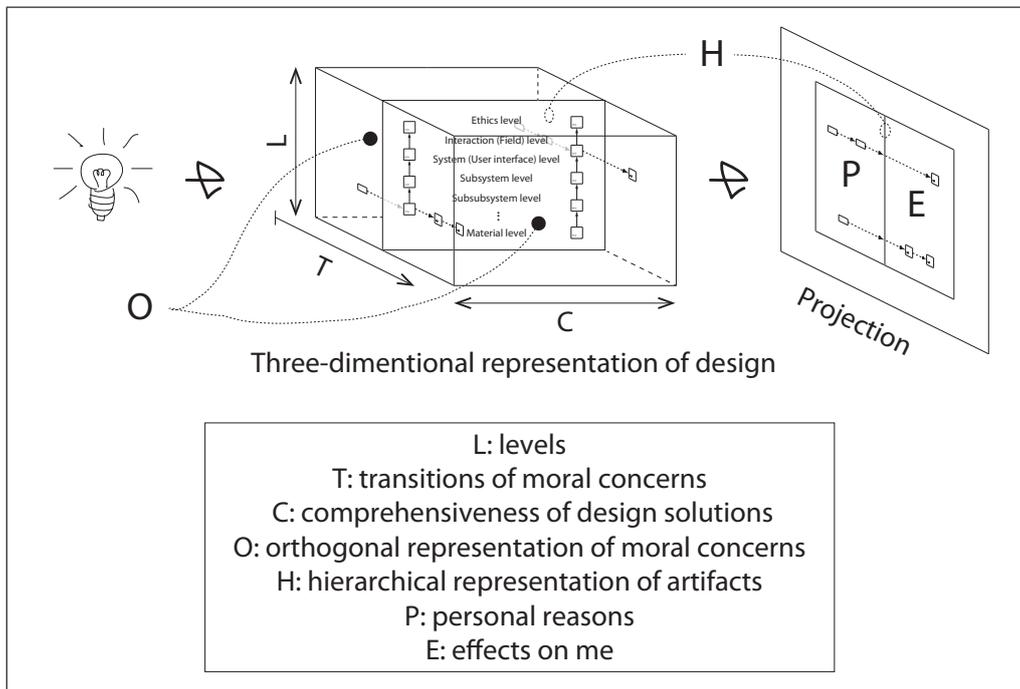


Figure 5: An image of the three-dimensional representation of design.

#### iv Three cases

In this chapter, we will introduce three cases to which I applied the fifth rule for the orthogonal representation of moral concerns. Three cases are as follows:

1. Redesign of the passenger plane
2. Design of “design from the ethics level” and “design with discourse”
3. Design of the fifth rule of design with discourse for the orthogonal representation of moral concerns

With these cases, we will make sure what the orthogonal representation of moral concerns is, what the fifth rule is, and how we use them.

#### Redesign of the passenger plane

The first case is a redesign of the passenger plane. This redesign was also described when we introduced design with discourse [Sekiguchi 10]. The point is that the purpose to make the world a more pluralistic place was added as a new root value of the passenger plane at the ethics level. And

this change allowed us to reconsider the experience of flying fundamentally. As a result, for example, we could think of the idea of the open airplane which allows us to experience the divergence of the nature in itself, which will urge us to enhance the plurality in the whole world.

Then, we applied the new version of the framework and the new method. For example, a description of the fifth rule contained in this case is such as:

Because I followed my belief that one of the better worlds is a pluralistic world, I design that the world will change to be more pluralistic, then I myself will change to live a better life.

Finally, Figure 6 shows an overview of the result of this case.

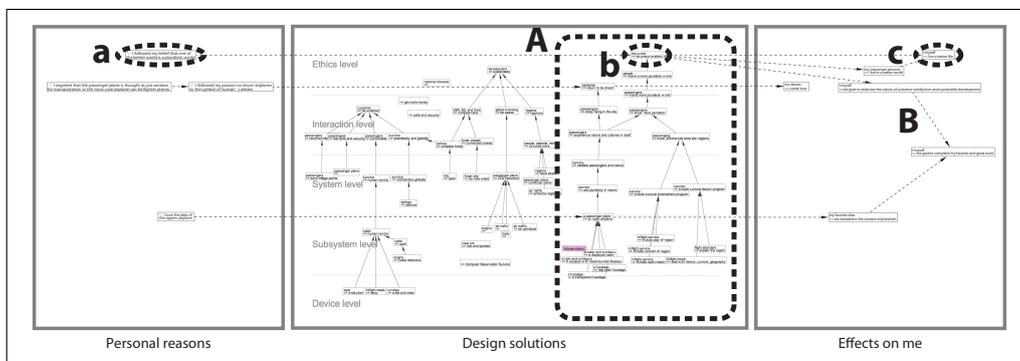


Figure 6: An overview of a case of a redesign of the passenger plane: (A) the part I redesigned, (B) a downward arrow, (a) : I followed my belief that one of the better worlds is a pluralistic world, (b) the world => be more pluralistic, and (c) I myself => live a better life.

### Design of “design from the ethics level” and “design with discourse”

The second case is the design of design from the ethics level and design with discourse. They are also results of themselves.

Then, we applied the orthogonal representation of moral concerns and the fifth rule of design with discourse to this case, too. For example, a description contained is such as:

Because I needed to position the humanities in the engineering because I love to learn the humanities, I design that design lexicon will contain ethical terms, then my learning the humanities in the school of engineering will be reasonable, and I myself will learn what I love to learn justly.

Finally, Figure 7 shows an overview of this case.

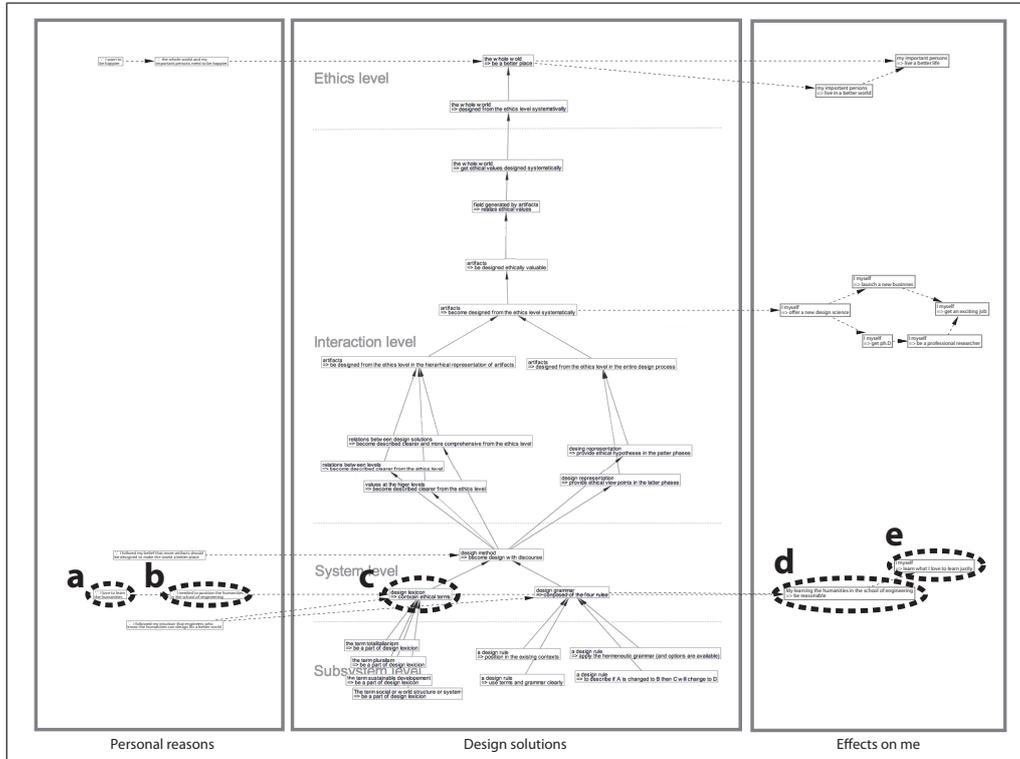


Figure 7: An overview of the case of the design of design from the ethics level and design with discourse: (a) ∴ I love to learn the humanities, (b) ∴ I needed to position the humanities in the engineering, (c) design lexicon => contain ethical terms, (d) my learning the humanities in the school of engineering => be reasonable, and (e) I myself => learn what I love to learn justly.

### Design of the fifth rule of design with discourse for the orthogonal representation of moral concerns

The final case is the design of the fifth rule of design with discourse for the orthogonal representation of moral concerns. They are also results of design with discourse for design from the ethics level, and what is described in this paper.

Then, we applied them to themselves. For example, a descriptions of the fifth rule contained in this case is such as:

Because I wanted to go beyond my previous work, I design that

design from the ethics level will change to get the three-dimensional representation of design, then I myself will change to be glad to go beyond my previous work which I thought complete, and be glad to have done great work.

Finally, Figure 8 shows an overview of this case.

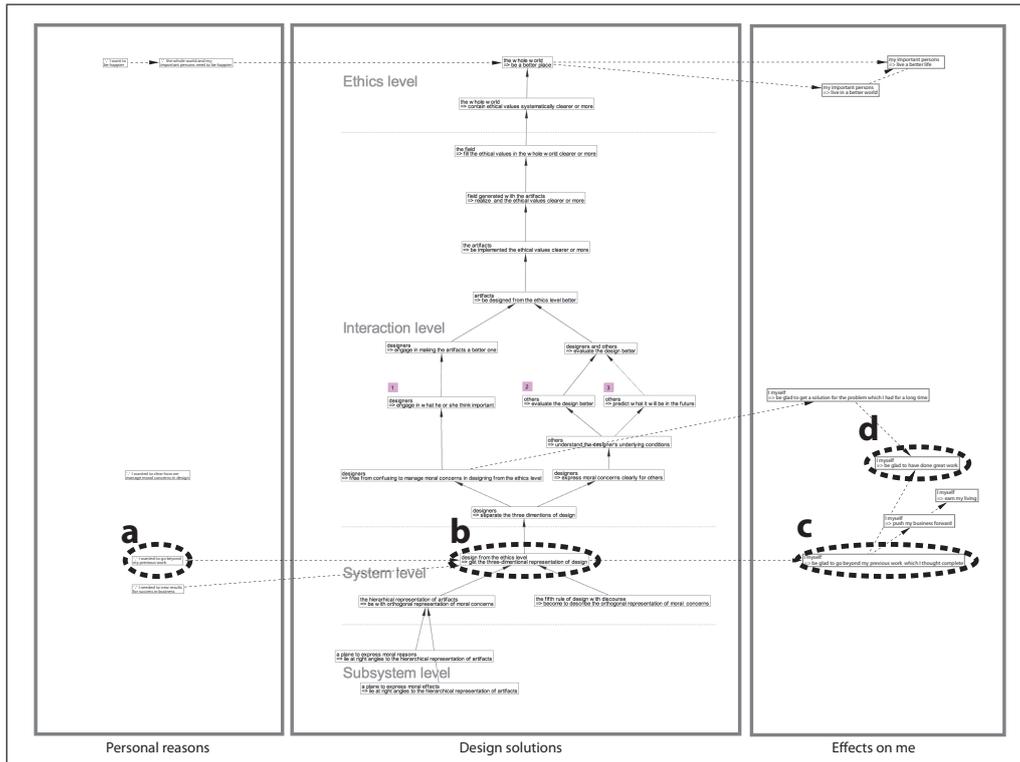


Figure 8: An overview of the case of the design of the fifth rule of design with discourse for the orthogonal representation of moral concerns: (a) ∴ I wanted to go beyond my previous work, (b) design from the ethics level => get the three-dimensional representation of design, (c) I myself => be glad to go beyond my previous work which I thought complete, and (d) I myself => be glad to have done great work.

By the way, this case has an exceptional character that the term “designers” appears at the interaction level. The reason is that designers are the users of the design framework and the design method, and the most important function of it is to extract designer’s moral concerns.

## v Evaluation

Our expectations we will evaluate here are as follows:

1. It is reasonable to distinguish the three kinds of representation.
2. It is reasonable to set the three fields for the three kinds of representation separately, temporally and orthogonally.
3. The orthogonal representation of moral concerns and the fifth rule make it more systematic to manage moral concerns in designing from the ethics level.

And we will also describe some know-how to utilize these three points for design from the ethics level.

### It is reasonable to distinguish the three kinds of representation

First of all, we could confirm that it is reasonable to distinguish the representation of moral concerns from the hierarchical representation of artifacts. It is because values described in the orthogonal representation of moral concerns naturally contain what do not have a room to be described in the hierarchical representation of artifacts. For example, in the cases, there are values concerning such as to follow my belief, to follow my passion, to satisfy my need, to make me happier and to be glad.

Then, we could confirm that it is reasonable to introduce the difference between the personal reasons and the effects on me. For example, personal reasons described in the second case suggest that I am an engineering student which I was when I designed it but am not now. This difference occurred because the description about the personal reason is a result of my having tried to describe facts at the time, so that we can not edit it no matter how much it became different from the present situation. To the contrary, we can change the description about the effects on me because they are just expectations in the future. For example, it is possible to change the description as follows:

**Before:** Because I needed to position the humanities in the engineering because I love to learn the humanities, I design that design lexicon will contain ethical terms, then my learning the humanities in the school of engineering will be reasonable, and I myself will learn what I love to learn justly.

**After:** Because I needed to position the humanities in the engineering because I love to learn the humanities, I design that design lexicon will

contain ethical terms, then I WILL CHANGE TO BE A FOUNDER OF A NEW DESIGN METHOD AND GET A GREAT HONOR OF IT.

By the way, by analogy with physics, we can understand that the first part of the fifth rule is like the force, the second is the momentum, and the third is the place. It means that there units are different, so that the distinction is right.

In conclusion, we could concretely confirm that the distinction between the three kinds of representation is reasonable, because the differences of descriptions between the three fields were sensible.

**It is reasonable to set the three fields for the three kinds of representation separately, temporally and orthogonally**

First of all, it was confirmed that the separate, temporal and orthogonal position is useful to describe the fifth rule to every level. As Figure 6, Figure 7 and Figure 8 show, images of the overviews of the cases are clear even though there are two kinds of descriptions: the fourth rule and the fifth rule. The clearness of the images is considered to represent the effects of the separate, temporal and orthogonal character.

Second, it is obvious that the three separate fields enhance us to understand that there are three kinds of representation. And because we have confirmed that the distinction is reasonable, setting them seems significant.

Third, it was confirmed that the separation is significant because it is considered that designers lay emphasis on the three kinds of representation differently. We will confirm this point with referring to related philosophy in Chapter vi.

Then, the separation was confirmed to be significant to get users' viewpoint, too. For example, as to the second case, it may not be significant for users whether or not I, the designer, love to learn the humanities; what is significant for the users may be whether or not design with discourse have a function to systematic design from the ethics level. It means that what is the most significant for the users is the effects on them, and the personal reasons and the effects on me are not always significant for them. If we separate and hide the orthogonal representation, then we will confirm that we are allowed to get the viewpoint of them.

In addition, it was confirmed that it is not always true that values at the higher level corresponds to the higher purpose in the orthogonal representation of moral concerns. For example, we can notice that there are arrows which direct downward as the arrow of "B" in Figure 6. The separate

and orthogonal position allows us to understand without confusing with the upward rule of the fourth rule.

In conclusion, it was confirmed that the separate, temporal and orthogonal position is reasonable.

## The orthogonal representation of moral concerns and the fifth rule make it more systematic to manage moral concerns in designing from the ethics level

First, we could notice that descriptions of the fifth rule described in Chapter iv easily induce moral questions such as:

1. Is it just to change the world to answer a personal belief?
2. How much is a student at university allowed to learn what he or she love to learn?
3. Is it just to design artifacts to feel a sense of achievement?

It is obvious that these questions are of moral investigations, and different from the questions induced by the hierarchical representation of artifacts and the original version of design with discourse. It means that it became more systematic to investigate the morals of the designer.

Second, another significant effect is to make it more systematic to check consistency of the description of moral concerns. As to the first case, there seems to be a gap in its consistency and we can correct it systematically if we use the fifth rule as follows:

**Before:** Because I followed my belief that one of the better worlds is a pluralistic world, I design that the world will change to be more pluralistic, then I myself will change to live a better life.

**After:** Because I followed my belief that one of the better worlds is a pluralistic world, I design that the world will change to be more pluralistic, then I myself will change to LIVE IN A BETTER WORLD AND live a better life.

This example shows that this type of consideration becomes easier.

Finally, it was also confirmed that to express moral concerns is useful to predict what the design will be in the future. For example, with the cases, we can figure out that I have a tendency to have personal reasons at the ethics level and around the system level. I consider that every designer may have favorite levels. And we can predict that values at the favorite levels

won't change unless the reasons will become insignificant. Furthermore, the level which is not the favorite one seems to have a tendency to be where the gap will arise. It means that these descriptions are useful not only for the designer himself or herself but also for other to understand and evaluate the design.

In conclusion, it was confirmed that design from the ethics level could get a way to manage moral concerns more systematically.

### cf. Know-how to apply the orthogonal representation of moral concerns and the fifth rule in designing from the ethics level

First of all, I would like to mention my stance to the three kinds of representation. The most significant representation I think is the hierarchical representation of artifacts because design means nothing without it. Then, the representation of personal reasons seems to have almost the same significance, because the best way I know to design valuable artifacts is to have good personal reasons. A good design can be what represents an individuality of the designer in its structure in the hierarchical representation of artifacts. And these personal reasons are to be a force to put the design forward and make the designer tough in difficult situations. The third is the representation of effects on me, because the design will often be uninteresting if we design from considering them.

Then, I have to withdraw my remark that the moral concerns are “secondary” ([Sekiguchi 10] p. 6) in the framework of design from the ethics level. It should be corrected as that one half of them is significant as much as the ethical concerns are.

Finally, when I design from the ethics level, I feel it better to begin imaging the three fields and sketching ideas in the hierarchical representation of artifacts in my mind. Just imaging them is enough to ease the confusion of moral concerns and utilize the personal reasons in design. Then, I write the ideas down on pages of my diary. I think I like to try to make my personal reasons represented in the design. In addition, it will be helpful to go back to the personal reasons when we come to a deadlock. But I may not consider the effects on me for a while.

## vi Related philosophy

Here we will introduce philosophical work related to the orthogonal representation of moral concerns and the fifth rule of design with discourse.

## Philosophy of differences between what is thought and the action to think

First, there are a lot of philosophical arguments which describes differences between what is thought and the action to think. I also distinguished them as our ethics and our morals ([Sekiguchi 10] pp. 5–7), and this paper can be an answer for the part I untouched, and shows that orthogonal is the relation between our ethics and our morals.

Then, we can refer the arguments of Hannah Arendt [Arendt 98], Max Weber [Weber 19] and Martin Heidegger [Heidegger 08]. In short, I consider that Arendt might suggest that to express the personal reasons is the most significant as “action” and to realize the hierarchical representation of artifacts is the second as “work”; Weber might suggest that we should forget the personal reasons and the effects on me and devote to constructing values in the hierarchical representation of artifacts alone; Heidegger might suggest that to intentionally consider the personal reasons and the effects on me is significant to be free from our “everydayness” and be a “historical” designer. These suggestions sound like contradictory one another but all of them are equally significant; they are pluralistic.

By the way, my position is more like that of Arendt and I consider Weber’s suggestion is too simple. It is because to separate the personal reasons from the effects on me provides a more insightful consideration that the personal reasons can play a key role to express individuality simultaneously in design. My understanding is that to utilize personal reasons in design is like Arendt’s “work” and to express the design in the form of discourse is like her “action.” Then, I consider Heidegger’s suggestion is too advanced. It is because to consider moral concerns too much can make me forget that our final purpose is to make the world a better place. In any case, what we could confirm was that the new version of our framework allows us to manage moral concerns systematically.

Then, to ignore the effects on me in design is not an easy negligence about the significance of the economy. For example, as Weber suggested, to consider own work primary can be the best way to personally succeed in the long run. I consider that it is not a problem if we ignore them intentionally.

Finally, Edmund Husserl’s “noema” and “noesis” [Husserl 83, Husserl 89] interestingly relate to the distinction. Roughly speaking, our ethics is what investigates the noema concerning design, and our morals is what investigates the noesis. Then, to describe the relation in detail is a part of my future work.

## Philosophy of knowledge and time

First, Katsuaki Tanaka investigates design transitions to extract knowledge applied to the design [Tanaka 08]. Tanaka suggests that it is more useful to investigate transitions of the object than to investigate its final state, because knowledge can be considered as what underlay when we changed the object. Then, we owned the idea of transition to his philosophy for the orthogonal representation of moral concerns and the fifth rule in this paper. For example, moral concerns can be considered to be such knowledge which will change the design in the future. And the fourth and the fifth rule of design with discourse is also considered to follow his philosophy, because they utilize the idea of transitions, too.

Then, Toshiaki Ishikawa investigated to describe causality a lot to cover the great comprehensiveness of phenomena and generate scenarios to foresee the future. And he confirmed this philosophy is useful to foresee incidents in the future [Ishikawa 07]. As to our work, to have confirmed the effects of the fourth and the fifth rule showed that this philosophy is also significant to design from the ethics level.

Finally, in relation to what “temporal” means, I may have a duty to refer to the philosophy of Martin Heidegger [Heidegger 08]. To describe relations between it and our work in detail is a part of my future work.

## vii Conclusion

In this paper, we orthogonalized the representation of moral concerns to the hierarchical representation of artifacts. And we also defined a method for it which is called the fifth rule of design with discourse. Then, we introduced three cases to understand concretely what they are and how we practice them.

One of the significant points we have confirmed is that to introduce the orthogonal representation of moral concerns allows us to understand the distinction between the artifacts in themselves and our motivations, incentives and their effects on the designer clearly. Then, it was also figured out that the fifth rule is useful to describe the moral concerns. As a result, we could get a way to be free from the difficulties to express moral concerns in designing from the ethics level. And we could become allowed to concentrate on the representation which seems to be primary systematically.

In conclusion, it became clearer to practice design from the ethics level because of the orthogonal representation of moral concerns and the fifth rule of design with discourse.

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