ISSN 2348-1218 (print)
International Journal of Interdisciplinary Research and Innovations ISSN 2348-1226 (online)
Vol. 8, Issue 3, pp: (15-22), Month: July - September 2020, Available at: www.researchpublish.com

Generalization and Specialization Process

Nagabhushana Maiya U.N

Mangalore, India

Author email id: bhushan_maiya@yahoo.com

Abstract: **This article describes about the generalization and specialization of the parameters. It also elaborates the process of both generalization and specialization. Mathematical explanation is also included. To make clear of the said concepts behind this article, examples are also included.**

This article explains the concept which would be very helpful in all the fields in several ways such as cost reduction, betterment of the productivity, innovations etc.

Keywords: **Parameters, sub-parameters(s), specific parameter, general parameter, qualification, specification.**

I. INTRODUCTION

Numerical quantity of the general parameter(s) is always more than that of specific parameter(s).

General parameter is least specific. Its sub-parameters are more specific.
Eg:- Quantity of set of numbers. In this statement numbers is a general parameter. Its quantity is maximum.

Even we can divide this general parameter into n number of sub-parameters.

Let us go ahead in a simple way, let us divide this general parameter → numbers into two parts.

1. Set of even numbers.
2. Set of odd numbers.

1. Set of even numbers:

1a .Set of prime numbers → 2

1b. Set of non-prime numbers → 4,6,8,10,……

2. Set of odd numbers:

2a. Set of prime numbers →1,3,5,7,11,…….

2b. Set of non-prime numbers → 9,15,21,……

Like this if we continue, this process of narrowing or dividing till the quantity of elements reaches zero or minimum, the parameter(s) having minimum elements can be termed as most specific parameter(s).

We can conclude here that if the quantity of the elements is maximum, then the parameter can be termed as general parameter or least specific parameter.

If the quantity of the elements is minimum, then the parameter can be termed as most specific parameter.

ISSN 2348-1218 (print)
International Journal of Interdisciplinary Research and Innovations ISSN 2348-1226 (online)
Vol. 8, Issue 3, pp: (15-22), Month: July - September 2020, Available at: www.researchpublish.com

The definition of the general parameter is shortest whereas the definition of the specific parameter is long or longest.

For example, a set of numbers is a definition of general parameter. A set of numbers which are divisible by 2 and it is a prime number is a definition of a specific parameter.

Let us consider the set of numbers. It can consists of even numbers, odd numbers, even prime numbers, even non-prime numbers, odd prime numbers, odd non-prime numbers. Even we can go further also.

Mathematically:-

$p_g \rightarrow p_{op}, p_{onp}, p_{ep}, p_{enp}$

Here p_g = General Parameter →Set of numbers.

p_{op} = Specific Parameter →Set of odd prime numbers.

p_{onp} = Specific Parameter 2 →Set of odd non prime numbers.

p_{ep} = Specific Parameter 3 →Set of even prime numbers.

p_{enp} = Specific Parameter 4 →Set of even non prime numbers.

Quantitatively:-

$q_g = q_e + q_o$ q_e = Quantity of even numbers

q_o = Quantity of odd numbers

$q_e = q_{enp} + q_{ep}$ q_{enp} = Quantity of even non-prime numbers

q_{ep} = Quantity of even prime numbers

$q_e = q_{onp} + q_{op}$ q_{onp} = Quantity of odd non-prime numbers

q_{op} = Quantity of odd prime numbers

$q_{gp} = q_{sp_1} + q_{sp_2} + q_{sp_3} + \ldots\ldots\ldots\ldots\ldots q_{sp_n}$

s_{p1} = Specific Parameter 1

s_{p2} = Specific Parameter 2

s_{p3} = Specific Parameter 3

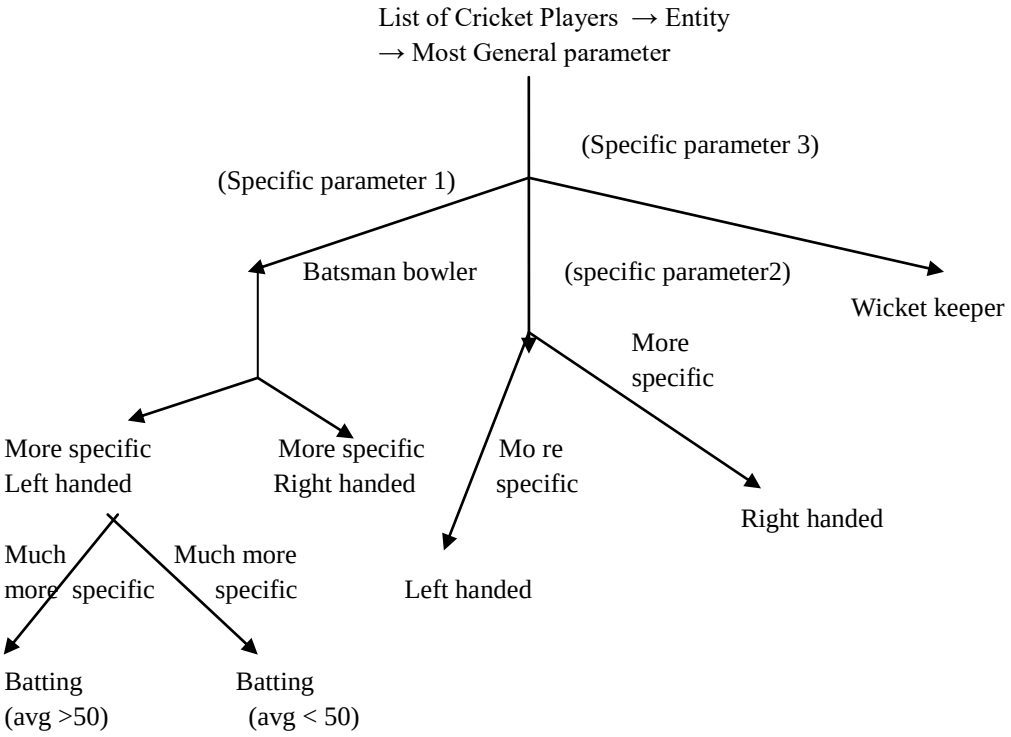
.
.
.
.

s_{pn} = Specific Parameter n

But in an entity like above, if we assign or add a parameter which is not derived from the existing parameter(s), then its quantity will always be zero. And hence, this parameter can not be considered.

But if the added parameter is derived from the existing parameters, then the parameter will be more specific. It is having extra speciality/qualification. This parameter will exists in that entity even if quantity is zero.

ISSN 2348-1218 (print)
International Journal of Interdisciplinary Research and Innovations ISSN 2348-1226 (online)
Vol. 8, Issue 3, pp: (15-22), Month: July - September 2020, Available at: www.researchpublish.com



In the above example as the level goes down, the parameter furthering to more specific. Still we can continue to bring more and more specification to the parameter. Also, the quantity of each and every specific parameter becomes lesser and lesser.

Here we can easily observe that if we add extra special character/property or qualification to the general parameter(s), it becomes specific parameter. In the above example, batsmen is one such specific parameter. By adding left handed/right handed qualification, the parameter would be more specific and its definition will be longer. The newly created specific parameters are left handed batsman/right handed batsman. This process we can term as **Specification Process**.

The advantage of this process is the one single large entity can be sub-divided into multiple entities and they can be called specific entities.

The analysis of these specific entities would be easy as the quantity of the elements in these entities are less. In this way specification process helps.

Picking of the faulty or quality elements would be easier. Even it leads to the generating ideas for the betterment of the elements and hence entities as well.

Searching can be made easier as the elements are less in each and every entity.

The reverse process of the specification process can be termed as **Generalization Process**. Just remove the qualification term/specific term from the respective parameters. In the already discussed example, just remove the left handed, right handed terms. The new parameter definition would become → batsmen. Now generalization process is occurred because left handed batsmen and right handed batsmen parameters merged into batsmen. Now remove the qualification batsmen from this specific parameter. Now the newly derived parameter is list of cricket players. Hence the parameters are generalized.

ISSN 2348-1218 (print)
International Journal of Interdisciplinary Research and Innovations ISSN 2348-1226 (online)
Vol. 8, Issue 3, pp: (15-22), Month: July - September 2020, Available at: www.researchpublish.com

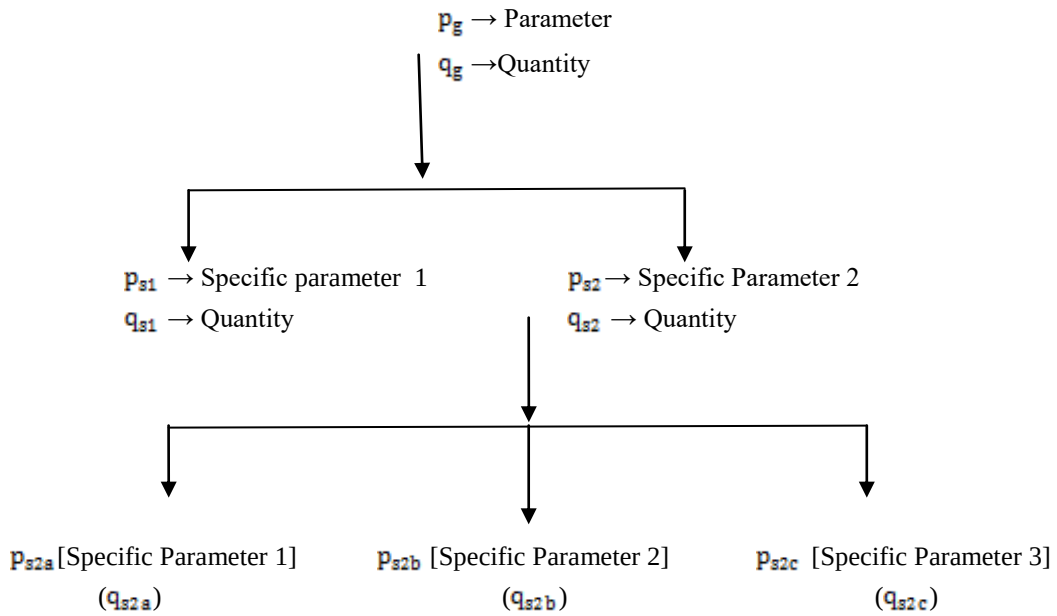
From this reverse specification process i.e generalization process, the quantity of the elements increases. From this analysis, we can easily conclude that the quantity of the elements under specific parameters is less than or equal to that under general parameter.

Now, start the specification process on the Cricket Team. Add the qualification →list of football players. This parameter do not have any significance here. Therefore, this qualification can be ruled out here. Add qualification→ List of fast bowlers. Now the new parameter definition would be 'List of fast bowlers in the Cricket Team'. Now , new entity will be created. It has fewer elements of general parameter→ Cricket Team. This qualification has significance in the process and it exists even if its quantity is zero. In future or later stage, its quantity may be non-zero. This qualification exists because this parameter is the integral part of the general parameter → List of Cricket Players/Cricket Team.

The quantity of the elements coming under this general parameter is always maximum. The quantity of the elements coming under the most specific parameter is either lowest or very low.

The sum of the elements of the specific entities coming immediately below the general entity is always equal to that of the general parameter.

If the specific parameter undergoes specification process, and if generates 3 specific parameters, then the sum of the elements of these newly generated specific entities is equal to that of the specific parameter.

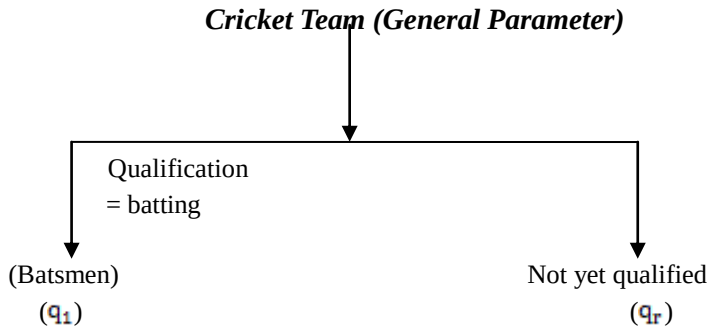


$$q_{s2} = q_{s2a} + q_{s2b} + q_{s2c}$$

The above situation is called the completed specification process. Because the elements of the general parameter has been distributed among the specific parameters.

ISSN 2348-1218 (print)
International Journal of Interdisciplinary Research and Innovations ISSN 2348-1226 (online)
Vol. 8, Issue 3, pp: (15-22), Month: July - September 2020, Available at: www.researchpublish.com

But sometimes specification process may not be complete. In such cases, some elements will remain under general parameter. Because for the remaining elements, qualification is not yet mentioned or simply say, specification is not yet done. This scenario is as shown below:-



Here, $q_g = q_1 + q_r$

q_g = Quantity of the elements of the general parameter

q_1= Quantity of the elements of the specific parameter → batsmen

$q_r = q_g - q_1$ = Quantity of the elements of the remaining in general parameter

$q_g = q_1 + q_2 + q_3 + \ldots\ldots\ldots\ldots\ldots + q_n$ is the formula representing the completed specification process.

$q_g = q_1 + q_2 + q_3 + \ldots\ldots\ldots\ldots\ldots + q_n + q_r$ is the formula representing the incomplete specification process.

In the above formulas, n represents the number of specific parameters.

q_1 = Quantity of elements of specific parameter 1

q_2 = Quantity of elements of specific parameter 2

q_3 = Quantity of elements of specific parameter 3

.

.

.

q_n = Quantity of elements of specific parameter n

q_r = Quantity of the remaining elements and having no qualification of any of the specific parameters

If q_r becomes zero, then we can say that specification process is completed.

The ratio of q_1 and q_g or q_r and q_g or q_3 and q_g….. q_r and q_g is always ≤ 1.

$\frac{q_1}{q_g} \leq 1$; $\frac{q_2}{q_g} \leq 1$; $\frac{q_3}{q_g} \leq 1$…….. $\frac{q_n}{q_g} \leq 1$

ISSN 2348-1218 (print)
International Journal of Interdisciplinary Research and Innovations ISSN 2348-1226 (online)
Vol. 8, Issue 3, pp: (15-22), Month: July - September 2020, Available at: www.researchpublish.com

If $q_r = 0$, then

$$\frac{q_1 + q_2 + q_3 + \ldots\ldots\ldots q_n}{q_g} = 1$$

If $q_r > 0$, then

$$\frac{q_1 + q_2 + q_3 + \ldots\ldots\ldots q_n + q_r}{q_g} \leq 1$$

q_r = Non qualified elements remained under general parameter

Similarly reverse specification process, i.e generalization process, if it is fully generalized, then

$q_g = q_1 + q_2 + \ldots\ldots\ldots\ldots\ldots + q_n + q_{r1} + q_{r2} + q_{r3} + \ldots\ldots\ldots\ldots + q_{rn}$

Here, q_1 …… q_n are the quantity of the generalized elements and are part of the general parameter.

But q_{r1} …… q_{rn} are the quantities of the elements which are not yet generalized i.e they are still exists under respective specific parameter.

If sum of q_{r1} to q_{rn} are zero, then we can say that generalization process is completed. Otherwise, we can say that generalization process is incomplete.

The quantity of the elements of general parameter is maximum. In mathematical term, we can term it as q_{max} . If the quantity of the elements of a specific parameter or parameters is 0 or 1 or lowest then it can be mathematically termed as q_{min} .

Therefore, we can term general parameter as Least Specific Parameter (LSP). We can term specific parameter or the list of specific parameters whose quantity is q_{min} as the Most Specific Parameter (MSP).

The ratio of q_{min} to q_{max} is always ≤ 1

Mathematically,

$$\frac{q_{min}}{q_{max}} \leq 1$$

The more the parameter has acquired the qualifications, the more it would be specific. It can be described as below :-

$P = \{a_1, a_2, a_3, \ldots\ldots a_n\}$ p → parameter

$a_1, a_2, a_3, \ldots\ldots a_n \rightarrow$ qualifications

ISSN 2348-1218 (print)
International Journal of Interdisciplinary Research and Innovations ISSN 2348-1226 (online)
Vol. 8, Issue 3, pp: (15-22), Month: July - September 2020, Available at: www.researchpublish.com

For example, in the college, some lecturers would be M.Sc graduates. Some lecturers would be M.Sc and M.Phil graduates. Among them, some may be Phd graduates.

Here,

Lecturers holding M.Sc [a_1] →specific parameter

Lecturers holding M.Sc [a_1], M.Phil [a_2]→ more specific parameter

Lecturers holding M.Sc [a_1], M.Phil [a_2], Phd [a_3]→ most specific parameter

Here, quantity of having only a_1 = m_1

quantity of having only a_2 = m_2

quantity of having only a_3 = m_3

Here, $m_1 \geq m_2$, $m_2 \geq m_3$

→ $m_1 \geq m_2 \geq m_3$

$\frac{m_3}{m_2} \leq 1$; $\frac{m_2}{m_1} \leq 1$; $\frac{m_3}{m_1} \leq 1$

The more you add the qualifications, to the parameter, the more the parameter becomes specific. The quantity of the elements will also be lessened.

Consider the following scenario :-

$p_{s1} = \{a_1, a_2, a_3\}$

$p_{s2} = \{b_1, b_2, b_3\}$

Suppose qualification a_2 and b_2 are same. Then if we try to add qualification of p_{s1}, and p_{sr}, then new specific parameter p_{s3} will be created. Its qualifications are $a_1, a_2 b_2, a_3, b_1, b_3$. Here qualification a_2 and b_2 are same, So written as $a_2 b_2$.

Mathematically,

$p_{s3} = \{a_1, a_2 b_2, a_3, b_1, b_3\}$

$= \{a_1, a_2, a_3, b_1, b_3\}$

See below example:-

p_{s1} = Batsman ={Batting, Fielding} = $\{a_1, a_2\}$

p_{s2} = Bowlers = {Bowling, Batting, Fielding} = $\{b_1, b_2, b_3\}$

Here a_2 and b_2 are same. a_1 and b_3 are also same.

Here if we combine qualification, $a_1 a_3$, $a_2 b_2$, b_1,then the new set of qualifications will be a_1, a_2, b_1.

This is $\{a_1, a_2, b_1\}$ = {Batting, Fielding, Bowling}. This new combination creates new parameter called p_{s3}. This p_{s3} parameter can be termed as all sounder.

We can play with all these qualifications of these existing parameters in different ways and combinations. By doing so, we can create so many specific parameters. But among them, some would be meaningless, some would be non-significant.

To make this point clear, let us take the above example again. Just remove the qualification a_2 . Then new specific parameter will be created. The parameter will have the qualification batting. The parameter is batsmen, but not doing fielding or does not have the fielding skills.

Remove qualification b_2 from p_{s2} . Once again new specific parameter will be created. This parameter is bowlers does not have fielding skills/not doing fielding.

But unfortunately these two specific parameters are meaningless in the sport of Cricket.

In this way by doing experiment of using as many as possible combinations of qualifications of one or more specific parameters, new specific parameters can be created. Some of these newly created specific parameters. help in creating totally new and unique entities also.

II. CONCLUSION

By doing the specification processes, we can create new things, new processes, new ideas. In all the fields we can implement the specification process. It helps us in new subjects, new technological devices, new discoveries, new methods etc, etc.

Lot of innovations can be accomplished by this process.

E.g :- Electrical device which is illuminating and circulating air
Electrical device which is illuminating and coolant also.

By playing with qualifications while doing the specification process, all the fields can get immense benefits.