Preserving spatial quality when transforming churches: different spatial solutions and their effects

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Abstract

This paper explores the effects of different spatial solutions that can be used for transforming neo gothic churches on the spatial quality to draw learning for future design assignments involving churches. This is done by analyzing 9 different neo gothic churches that are transformed and have been given a new function. To start, the attributes that define the spatial quality and characteristics of the neo Gothic were determined. Different spatial solutions were also determined whereupon the different case studies were selected. These cases were examined using analytical diagrams and photo analysis. The research resulted in an overview of all the effects of different spatial solutions on the predetermined spatial aspects. The results showed that certain spatial solutions affect the spatial quality more than others as well as that there is a big difference in which attributes are affected by each spatial solution. Future research recommendations are to improve the number of studied cases per spatial solution and as well examining as whether the intervention on the existing building added new spatial quality.

Key words: Spatial quality, Spatial solutions, Neo gothic churches, heritage, transforming churches, interventions, perception of space

1. Introduction

Church attendance in the Netherlands has been declining for years. ''Churches are becoming increasingly empty and that means regular closures. Until 2030, as many as a thousand churches will close.'' (nieuwsuur, 2018). There are about 7,000 churches in the Netherlands (cultural heritage, 2020) Many of these churches will be without a function in the coming years. An empty church only costs money and may eventually lead to its demolition. However, many people would greatly regret the demolition of these churches. Even though the number of believers is decreasing, a church can be of value to non-Christians as well. Many of these buildings are part of our cultural heritage. ''Heritage is often defined as our legacy of the past, by which we live in the present. This legacy we pass on to future generations so that they too can learn from it, admire it and enjoy it''(UNESCO, 2019). The church is often seen as a symbol, a carrier of faith, art and culture, especially now in an increasingly globalized world. Church buildings are like anchors in time; they tell us who we are and where we come from (Reinstra et al., 2020). In many villages and cities in the Western world, the church used to be the most important building. That's where everyone gathered, it was a place for faith but also for gathering. Looking at an average church and one can see right away that it involved an important function. The building looks important and is still often the tallest building in the place of residence, especially with Roman Catholic churches. Not only the outside but also the inside of a church has a certain spatial quality, it evokes a certain feeling. The high rooms with vaults and the light from the tall stained glass windows gives an atmosphere that other buildings do not have.

One way to protect these buildings is to give them a new function. However, this is not always easy. Churches often do not meet the requirements of the new function such as daylight and comfort. In practice, it appears that with expertise, this type of radical change can be designed in a good way while respecting the historical and architectural values of the monument (Een toekomst voor kerken, 2011). The challenge lies in the fact that the church building must be adapted to accommodate the new function or functions but the qualities also have to be preserved. This is often not the case, the main form of the building is usually well preserved, but the content changes. The church retains its presentation value in the town or villagescape but the characteristic and atmospheric interior elements often no longer have a place (Reinstra et al., pp. 21). The spaciousness that a church interior possesses can also be greatly affected. Especially with new functions such as housing or offices, spatiality is often lost. This is for example the case with the Martinuskerk in Utrecht or the Josefkerk in Hilversum. Here, the volume of the church is completely divided into small spaces and nothing of the spatiality remains (Reinstra et al., pp. 20).

The purpose of this paper is to identify the effects of different spatial solutions for transforming churches on the spatial quality and draw learning from them for future design assignments involving churches. That is; to name the striking findings and make a statement about the positives and negatives of the different design strategies. In order to do this, first a better understanding needs to be created of what aspects determine the spatial quality of a neo gothic church and what the characteristic elements of these churches are. Subsequently, the aim is to gain insight into how spatiality in a church can be effected through interventions and what the effects are on the experience of space and the characteristic elements of neo gothic churches.

2. Theoretical framework

Research related to the concept of spatial quality has been done before. However the concept of spatial quality turns out to be a difficult concept. 'It is very difficult to get a grip on the concept. This is because the concept can be filled in with all kinds of meanings'' (Alkema et al., 199 C.E.). Spatial quality is the extent to which the use value, amenity value and future value of various interests are met in spatial developments. The interests may be economic, ecological, social and cultural (*Categorie: Geldige Begrippen - AQUO*, n.d.) Studies have also been done by Fernanda Acre & Annemie Wyckmans in; Spatial quality determinants for residential building renovation, where the concept is discussed in relation to residential buildings.

The literature therefore describes spatial quality as the value of the environment to users, in a given area and at a given time. But the concept can also be understood in a more narrow way as related to the visual experience by people (Leonie Janssen-Jansen et al, 2009). In this paper the concept; spatial quality is related to the experience of space, or more concretely; the experience of space in a neo gothic church. The experience and quality of space is clearly different from other buildings. This is due to the typical space layout and architectural style and the connection between the design of the space and the function of a church, namely a house of prayer or ''house of god.'' The perception of the interior of a Gothic church is related to the characteristics of Gothic architecture. For example, the floor plan of neo-Gothic churches is almost always cruciform (after the cross of jesus christ) and there is a strong rhythm that comes from the construction of bays, unity and clarity is a key concept. There is also an emphasis on the vertical and skeletal construction allows room for extra windows for lots of light, The church was built upward toward god, this created high spaces but also a narrow nave (especially in basilicas). This also often meant an oblong volume if many people wanted to be received. Further characteristics of Gothic architecture include pointed arches and cross-rib vaults and symmetrical composition. These features were taken from the following literature; *'Het kerken boek* ''(Van Lier, 2009), *''De bouw van kerken en kathedralen''* (Hislop, 2020) and *''De kunst van de Gotiek''* (Toman et al., 1999).

In this paper, transformed church interiors were analyzed. ''Analyzing designs or plans created by others provides insight into the design and the resources used in the process (Leupen, 2010). In this paper, it is a way to document the different effects of multiple interventions. There are several ways this can be done. One way is through analysis drawings/diagrams such as exploded views or an isometry of space. This can clarify the construction and structure of a space. These are forms of analysis that can be seen in books such as; *Analyzing architecture* (Unwin, 2002), *Architecture Form, Space, and Order* (Ching, 2014b) and *Ontwerp en analyse* (Leupen, 2010). Another way interiors can be analyzed is through photo or image analysis. This technique is common in the photography and art world. When analyzing architecture in art, one can look at the means; form, composition, color, scale, light, space, material and techniques (van de Kamp, M. T. A. ,2019). The book; The drama of space (Kleine, 2017c) was also consulted. It examines the composition and articulation of architectural spaces in terms of spatial dramaturgy, as a repertoire of means and strategies to shape the spatial experience. Again, it uses case studies that are carefully analyzed through drawings and photographs where a textual analysis is written. These analysis techniques were also applied to the case studies of this paper.

3. Research questions and methodology

In this Research paper, the main question that has been researched is:

What are the effects of the most typical spatial interventions used to repurpose Neo-Gothic churches in the Netherlands on the spatial quality and characteristic architectural interior elements of the church. To answer this question the following sub questions need to be answered first:

Which attributes of Neo-Gothic churches make up the spatial quality?

What are in general the architectural characteristic interior elements within Neo-Gothic churches?

What are the most common and typical kinds of interventions made when repurposing Neo-Gothic churches?

Several methods of research have been done. To answer the main question, the sub-questions had to be answered first.

In order to preserve spatial quality in transformed churches, it was first necessary to determine which aspects affect the spatial quality in Neo-Gothic churches. This is done trough a literature study on the concept of spatial quality and spatiality.

From the earlier mentioned sources: *''Het kerken boek''*(Van Lier, 2009), *''De bouw van kerken en kathedralen''*(Hislop, 2020) en *''De kunst van de Gotiek''*(Toman et al., 1999) the neo ghotic karakteristics have been listed. The attributes defining the spatial quality in neo gothic churches are collected from the sources; Analysing architecture (Unwin, 2002), Architecture Form, Space, and Order (Ching, 2014b) ook worden er begrippen om te analyseren omschreven in het boek *The drama of space* (Kleine, 2017c) and in the info sheet; *Kunst analyseren begrippen kunst algemeen & CKV* (van de Kamp, M.T. A., 2019). The book; *Kerkgebouwen : 88 inspirerende voorbeelden van nieuw gebruik* (Damme, 2020) was also consulted. From these, a selection was made which is shown below.

The attributes defining the spatial quality in neo gothic churches have been brought down to:

- The dimensions of the space - great height, smaller width, long length
- Proportions/ scale - big
- Threefold division
- Rithm/ repetition
- Shape of the floorplan - cross shaped
- Lighting from above
- Long sight lines
- Symmetry
- Detail and ornamentation

The main the architectural characteristic elements of Neo-Gothic churches that are being used are:

- large stained glass windows
- rose windows
- pointed arches
- rib vaults
- (flying) buttresses
- ornate decoration

The main question addressed in this paper came about mainly through the 2011 document; A Future for Churches prepared by the Central Government. This document is a guide for repurposing vacant church buildings, it covers many aspects involved in transforming churches. The most striking part is where ten spatial solutions are presented on how to deal with the space in and around a church to create new functions. These different solutions are starting points in a design process and have major implications for the spatial quality and characteristics of the church. Therefore, these ten spatial solutions are the basis for this study. See below the ten solutions with explanation, to limit the research are not all ten solutions are treated in this paper, but only solutions 2 to 8 (see explanation).

1. **Full space remains intact**
   In this solution, the space remains completely intact but is utilized by another function. Because this strategy requires little structural intervention, it is not addressed in the analysis.
2. **Loose built-in**
   With loose built-in, individual units are placed in the church space. These units have little impact on the spatial experience and may consist of scaffolding, floor structures or galleries.
3. **Use ancillary spaces**
   In this strategy, only the ancillary spaces of the church are redesigned (such as chapels, side aisles or the galleries above the side aisles) here the main space remains open.
4. **Vertical splitting**
   With vertical division, a dividing wall divides the church in two.

5. **Horizontal splitting**
   A horizontal split involves dividing the building horizontally into two by adding a new floor.
6. **Box in the church**
   A large, freestanding structure (a "box") is built inside the church, filling most of the nave.
7. **Lines of sight preserved**
   Here, the church is largely filled in but important sight lines are preserved, for example, from the entrance to the choir or from the floor to the vaults.
8. **Fill**
   In this solution, the church space is fully utilized by completely filling it in with new spaces.

9. **Additions**
   This strategy involves building on or on the exterior of the church. (This way is not included in this study because here the focus is on the exterior of the church, not the interior).
10. **Partial demolition**
    Here part of the church will be demolished because, for example, the church is too large for the new function. This solution is also not included in the study because it is very dependent on which part will be very much demolished and it is not clear if anything will be added.

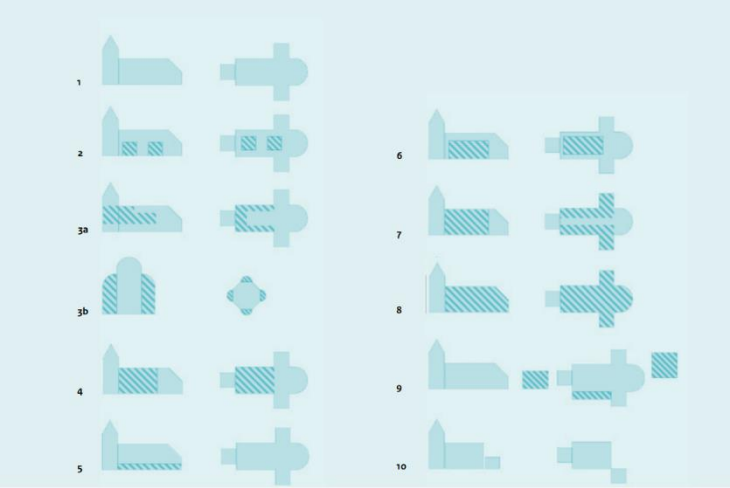

Figure 1: Different spatial solutions (Een toekomst voor kerken, 2011)

After the attributes of spatial quality and Neo-Gothic architecture had been determined and the spatial solutions were made clear, 9 case studies were collected. The criteria for these case studies where as follows:

- The cases are all transformed churches who have received a change of function
- The churches are all build in neo gothic style or similar to that style
- The churches correspond to one or two of the spatial solutions that have been established

The churches (with their corresponding spatial solution) that have been analyzed are:

1. De Petrus, Vught (Use ancillary spaces & Horizontal splitting)
2. Dominicanenkerk, Maastricht (Loose built-in)
3. Broerenkerk, Zwolle (Loose built-in & Use ancillary spaces)
4. Cuyperskerk, Sas van Gent (Use ancillary spaces)
5. Grote kerk, Hoorn (Vertical splitting (transverse) & Horizontal splitting)
6. Westerkerk, Utrecht (Box in the church)
7. Sint-Gertrudis-van-Nijvelkerk, Heerle (Lines of sight preserved (partly fill))
8. Heilighartkerk, Breda (Fill)
9. St.-Theresia-van-het-kind-van-jezus kerk, Borne (Lines of sight preserved (partly fill))

Once the different churches were selected, they were analyzed on how the architectural intervention that was made has had an effect on the spatial quality and whether the characteristic elements of the neo Gothic are affected. An example of one of the case studies (De Petrus) is shown below:

First, information, drawings and photos of the case study were gathered. From this a exploded view was made. This is done to create a better understanding of the spatial layout of the project and how the new intervention has changed the perception of space. This method of analysis was inspired by analysis drawings made by *Ching* in; *Architecture Form, Space, and Order*. The intervention is colored blue to highlight the new against the old. Plans and sections of the project are also shown here and the spatial solutions that are used in the project. See image below.

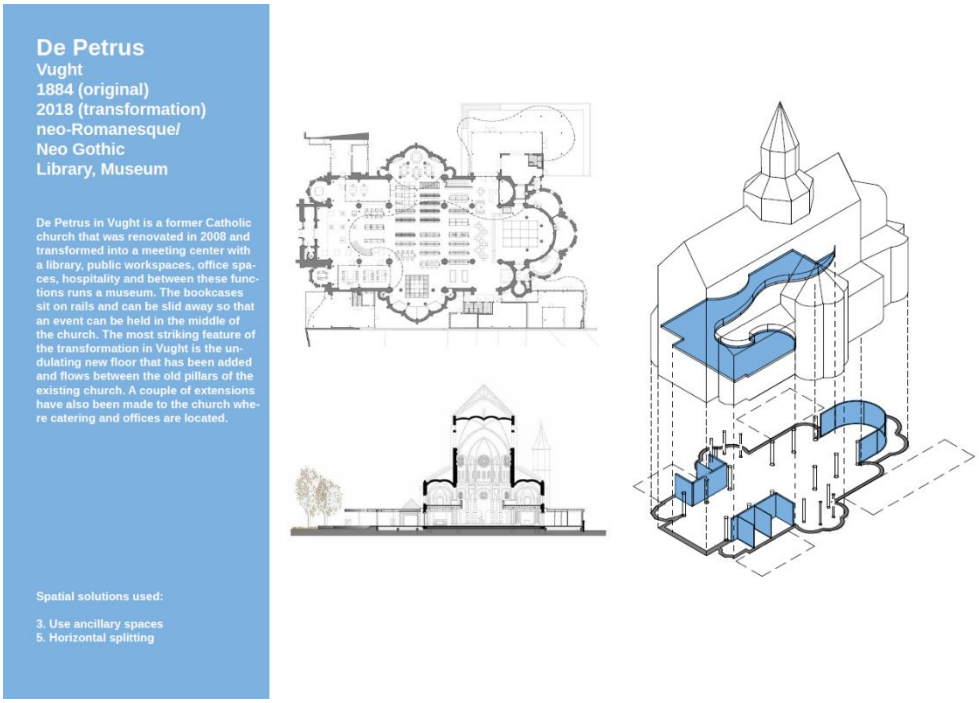

Figure 2. first page of the analyses, with information and exploded view of the project. (De Petrus)

Secondly, a photo is selected where most of the interior of the church is visible, this is often in the nave at the entrance. This photo is analyzed by highlighting the multiple attributes described before. They are accentuated by a dashed line or arrow. When the corresponding attribute is affected, the line or arrow is colored red or yellow. Red means highly affected and yellow minimal affected, which can mean the dimension is slightly changed or it is only affected at a few places. When the attribute is not affected at all it is colored white. These way of analyzing is similar in ways that H. Kleine does it in his book; *The Drama of Space*. There cases are analyzed by means of text, photo's with explanation and isometrics and perspective drawings. In this paper instead of writing next to the photo, the elements are highlighted on the photo.

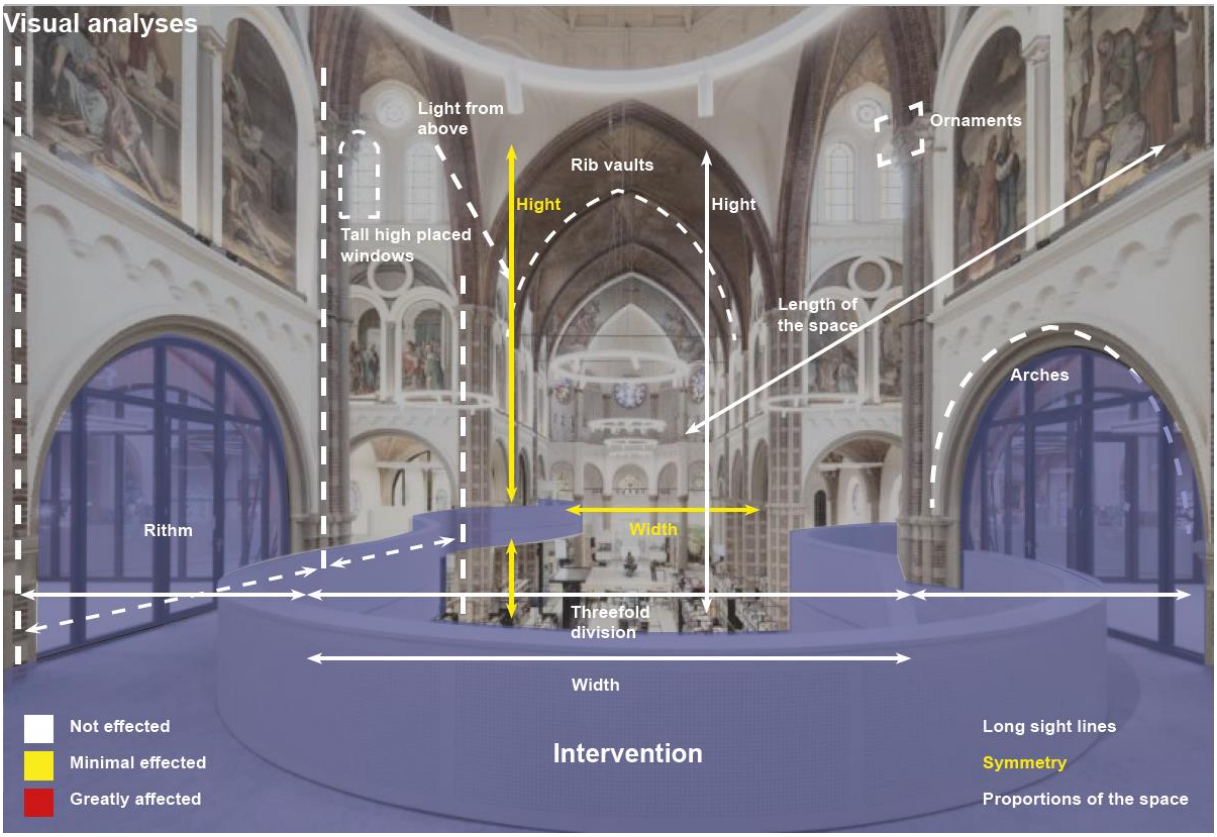

Figure 3. visual photo analyses of ''De Petrus''

Here the attributes that define the spatial quality and belong to neo gothic churches are visually shown. These attributes are then listed in a table (table 1) in de first column. In de second column the degree of the effect is shown (no effect, minimal or high) and in de third column the effect is explained. Then in the fourth column the type of intervention that caused this effect is displayed, this is done because some of the case studies have multiple spatial solutions, here is shown which solutions created this affect. For instance de Petrus has two spatial solutions; horizontal splitting an use of ancillary spaces. The table is shown below.

Attributes defining the spatial quality in Neo Gothic churches			
Attribute	**Is the attribute affected by the Intervention?**	**Effect**	**Which type of intervention caused this effect?**
Dimensions of the space			
Height	minimal	The height of the space is affected at a few places by adding an extra floor, this is mainly in the ancillary spaces but also a part of the nave.	5. Horizontal splitting
Width	minimal	At the level where the new floor is placed, the width of the space is affected, because the floor is a wavy element the width is larger at some places than others.	5. Horizontal splitting
Length	no		
Threefold division	no		
Rhythm/ repetition	no		
Lighting from above	no		
Long sight lines	no		
Symmetry	minimal	The symmetry of the interior space is affected because, de floor is an asymmetrical addition that goes through the entire space. The symmetry of the existing church is still visible.	5. Horizontal splitting
Proportions of the interior space	no		
Characteristic building elements of Neo Gothic churches			
Large stained glass windows	no		
Rose windows	-		
Pointed arches	minimal	The pointed arches are still visible but glass walls have been placed inside the arches opening. The arches itself have remained untouched.	3. Use ancillary spaces
Rib vaults	no		
(Flying) buttresses	-		
Ornate decoration	minimal	Some of the ornaments are less visible, because of the added floors and glass walls, but everything has remained intact and mostly visible.	5. Horizontal splitting 3. Use ancillary spaces

Table 1. results visual analyses of one of the case studies (De Petrus)

Of each of the case studies a similar table has come out. The results of all the case studies together are further explained in results.

4. Results

After the visual analyses of the 9 case studies were completed, the results are presented in a conclusion table, see below:

Spatial solutions	Loose built-in		Use ancillary spaces			Vertical splitting (transverse)	Horizontal splitting		Box in the church	Lines of sight preserved (partly fill)		Fill
Case study	Dominican	Broeren	De Petrus	Broeren	Cuypers	Grote	De Petrus	Grote	Wester	St.-Gertruidis	St.-Theresia	Heilighart
Height	🟡🟡		⚪🟡🟡			⚪	🟡🔴		🔴	🟡🟡		🔴
Width	🔴🟡		⚪🟡🟡			⚪	🟡⚪		🔴	🟡🔴		🔴
Length	🟡⚪		⚪⚪⚪			🔴	⚪⚪		🟡	🔴🔴		🔴
Threefold division	🟡⚪		⚪⚪⚪			⚪	⚪⚪		⚪	⚪🟡		🔴
Rhythm/ repetition	⚪⚪		⚪⚪⚪			⚪	⚪⚪		⚪	⚪🟡		🟡
Lighting from above	⚪⚪		⚪⚪⚪			⚪	⚪🔴		⚪	⚪🟡		🔴
Long sight lines	⚪⚪		⚪⚪⚪			🔴	⚪⚪		⚪	🟡🟡		🔴
Symmetry	🟡🔴		⚪⚪⚪			⚪	🟡⚪		🔴	⚪🟡		🔴
Proportions of the interior space	🟡⚪		⚪⚪⚪			🟡	⚪🔴		🔴	⚪🟡		🔴
Tall stained glass windows	⚪⚪		⚪🟡⚪			⚪	⚪🔴		🟡	⚪🟡		🔴
Pointed arches	⚪⚪		🟡⚪🟡			⚪	⚪⚪		⚪	🟡⚪		🟡
Rib vaults	⚪⚪		⚪⚪⚪			⚪	⚪🔴		⚪	⚪⚪		🔴
Ornate decoration	🟡🟡		🟡🟡⚪			🟡	🟡🟡		🟡	⚪🟡		🟡

Table 2. Results of the case studies. In white (unaffected), yellow (minimal affected) or red (highly affected)

On the left the attributes are listed and at the top the case studies are categorized on their spatial solution. The colored dots indicate whether an attribute is unaffected (white), minimally affected (yellow), or highly affected (red). Several things stand out when looking at the table. First, it is noticeable that the strategy; Use of ancillary spaces seems to perform best on most points due to the fact that of the three case studies that used this strategy, no attribute is highly affected. Most attributes are not affected and a few are minimally affected, such as the height and width and the pointed arches.

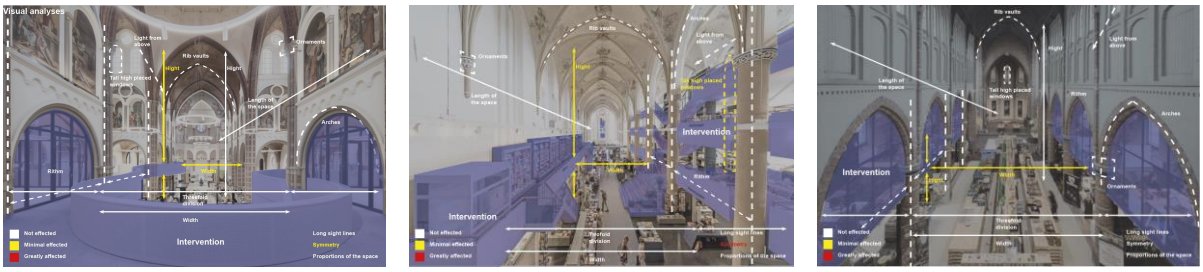

Figure 4: spatial solution; use of ancillary spaces in 3 churches (De Petrus, Broerenkerk, Cuyperskerk).

The loose built-in also performed well. Only the width in the Dominican Church and the symmetry in the Broeren kerk are strongly affected. Of the remaining attributes, a small portion is minimally affected and the rest are not. The strategies; vertical splitting, horizontal splitting, box in the church and Lines of sight preserved (partly fill) follow after and score fairly equally in the amount of green, yellow and red dots. However, a difference can be seen in which attributes are affected per church. For example, in the Grote kerk the vertical splitting affected mainly the length and sightlines, but in this same church the horizontal splitting affected the height and made the light from above less visible. This also affected the proportions of the space, the tall windows and the rib vaults.

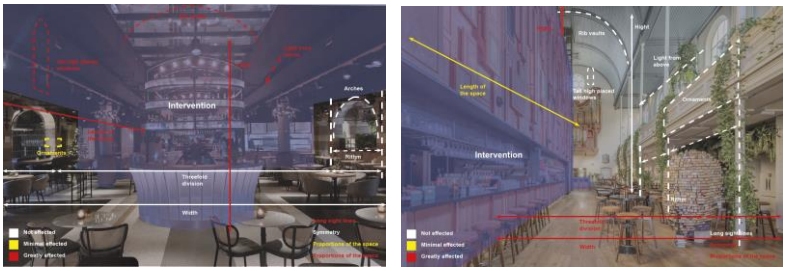

Figure 5: analyses of The Grote kerk in Hoorn and on the right The Westerkerk in Utrecht

What is striking is that the Petrus also uses a horizontal split but because this new floor only covers parts of the space the effect is less harmful to the attributes, therefore it scores reasonably well; only the height, width, symmetry and ornaments are minimally affected. The Westerkerk in Utrecht follows the principle of the box in the church. Here both the height and width are strongly affected as are the symmetry and proportions of the space. However, aspects such as the threefold division, rhythm, light from above and sight lines have been well preserved. The design solution; Lines of sight preserved (partly fill) scores differently in the two case studies that used this method. The St.-Gertruidis church in Heerle scores quite well with only the length strongly affected and the height and width minimal. In contrast, the St.-Theresia church in Borne scores worse, with a bad score for width, length and much of the rest minimal. So with this strategy it matters a lot in which way it is applied. The last and worst scoring design solution is; Fill. Because the entire church is being filled, all attributes are affected, most of which are strong and only rhythm, pointed arches and ornaments score minimal. In conclusion, the strategy; Use ancillary spaces affects the least attributes, followed by; Loose built-in and then by the strategies; vertical splitting, horizontal splitting, box in the church and Lines of sight preserved (partly fill) which score about the same but where it strongly depends on which attribute you find more important. And finally; Fill which clearly scores the worst on all points and affects the spatial quality the most.

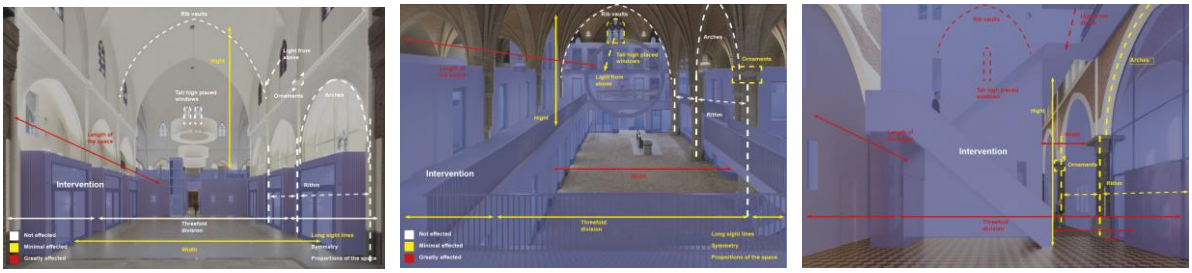

Figure 6: spatial solution; Lines of sight preserved (partly fill) (The St.-Gertruidis church & St.-Theresia church) and spatial solution; fill (Heilige hartkerk)

5. Discussion

This research paper tried to identify the effects of the most typical spatial interventions for neo gothic churches. The types of interventions were taken from the document; Een toekomst voor kerken (2011). There are several ways to distinguish interventions from each other, this is one way to do it.

The attributes established to describe the concept; spatial quality in neo gothic churches were taken from literature but summarized to the attributes mentioned here. It is therefore important to mention that these are not the only right attributes to define spatial quality. This is also the case for the characteristics belonging to the neo Gothic architecture.

The case studies were selected based on pre-established criteria, found in the methodology. One of these criteria was that they have to be linked to 1 or 2 spatial solutions. In a couple of case studies it was difficult to determine which spatial solution was associated with it, because sometimes several solutions were used interchangeably or partially in the case studies. In that case has been critically examined which solution creates which effect. For the visual analyses it was chosen here to analyze from one predetermined perspective from the interior in which the entire space is best seen, often this was the viewpoint at the entrance, looking toward the back of the church. In some of the case studies this was more difficult because the space was partly filled up and so there was no longer any perspective in which the entire interior was visible, this was for example the case at the Grote Kerk in Hoorn and the Heilige Hart Kerk in Breda. Here also the perspective was taken from the entrance but at these churches the outcome would have been different if the analysis was taken from a different vantage point.

The following points should be taken into account, viewing the results.

- The scores given in the analyses do not necessarily mean a ''bad'' or ''good'' score, but only show if the spatial quality is affected or not.
- The assessment of one of the spatial solutions does not necessarily result in the given score, because a spatial solution can be implemented in a design in multiple ways, each with a different effect.
- The number of case studies per spatial solution is too small to make a strong statement. A follow-up study should examine more cases per spatial solution.
- This paper started out with the existing spatial quality of the churches and examined whether it was affected. it did not look at whether a new spatial quality was returned. This is also a recommendation for future studies.

6. Conclusion

This research searched to answer the question;

What are the effects of the most typical spatial interventions used to repurpose Neo-Gothic churches in the Netherlands on the spatial quality and characteristic architectural interior elements of the church.

This was done to provide designers with tools and insights to transform Neo-Gothic churches where the focus is on the preservation of the spatial quality and neo gothic elements of the church. First the most typical spatial interventions were determent, as well as the attributes that define the spatial quality and neo gothic elements. This was done through a literature study. Next, the effects of the spatial interventions in the churches were analyzed. The results of this analysis are shown in Table 1. The table shows the case studies with their corresponding design solution and how this design solution scores on different spatial aspects, ranging between; strongly affected, minimally affected or not affected. From the results it can be concluded that certain design strategies affect the tested attributes more than others, but some spatial solutions score better on certain aspects and worse on others, so one is not necessarily better than the other. The following design solution on average affected the attributes the least; Use ancillary spaces, followed by; Loose built-in and then by the strategies; vertical splitting, horizontal splitting, box in the church and Lines of sight preserved (partly fill) which score about the same but it strongly depends on which attribute is considered more important. And finally; Fill, which affects the attributes the most. These findings can be used to make a more informed choice between different spatial solutions in a design process.

7. Bibliography

Jansen, L. B., Klijn, E., & Opdam, P. F. M. (2009). Ruimtelijke kwaliteit in gebiedsontwikkeling.

Van Lier, S. (2009). Het kerken boek.

Hislop, M. J. (2020). De bouw van kerken en kathedralen: een geïllustreerd overzicht van de constructie van middeleeuwse bouwwerken.

Toman, R., Bednorz, A., Buthod-Girard, I., & Doelman, E. (1999). De kunst van de Gotiek: architectuur, beeldhouwkunst, schilderkunst.

Unwin, S. (2002). Analysing Architecture. Routledge.

Ching, F. D. K. (2014b). Architecture: Form, Space, and Order. John Wiley & Sons.

van de Kamp, M.T. A. (2019). Kunst analyseren begrippen kunst algemeen & CKV. Amsterdam; ILO UvA, Expertisecentrumkunsttheorie.

Leupen, B. (2010). Ontwerp en analyse. 010 Publishers.

Kleine, H. (2017c). The Drama of Space: Spatial Sequences and Compositions in Architecture. Birkhäuser.

Alkema, Y., Van Der Veen, I., & Town-Net. (199 C.E.). Methode Voor Ruimtelijke Kwaliteit.

Erfgoed, R. V. H. C., Rijksdienst voor het Cultureel Erfgoed, & Bureau Overland (Wageningen). (2012). Een toekomst voor kerken: handreiking voor het aanpassen van kerkgebouwen in religieus gebruik. Sociaal en Cultureel Planbureau.

Ministerie van Onderwijs, Cultuur en Wetenschap. (2021, January 20). Eén op de vier kerkgebouwen heeft een nieuwe functie. Nieuwsbericht | Rijksdienst Voor Het Cultureel Erfgoed. Retrieved October 10, 2022, from https://www.cultureelerfgoed.nl/actueel/nieuws/2020/11/30/een-op-de-vier-kerkgebouwen-heeft-een-nieuwe-functie

Nieuwsuur. (2018, Augustus 25) De #kerken lopen steeds verder leeg en dat betekent regelmatig sluiting. From https://twitter.com/Nieuwsuur/status/1033452189094572032?ref_src=twsrc%5Etfw%7Ctwcamp%5Etweetembed%7Ctwterm%5E1033452189094572032%7Ctwgr%5E1e666682ffb09574756e90aaa60656e95959d9c1%7Ctwcon%5Es1_&ref_url=https%3A%2F%2Fcvandaag.nl%2F69281-tot-2030-gaan-in-nederland-zon-duizend-kerken-dicht%3Fviacip%3Dtrue

Fernanda Acre & Annemie Wyckmans (2014) Spatial quality determinants for residential building renovation: A methodological approach to the development of spatial quality assessment, International Journal of Sustainable Building Technology and Urban Development, 5:3, 183-204, DOI: 10.1080/2093761X.2014.923793

Key, S., Mark, M. D. & Do, E. Y. (z.d.). Computing Spatial Qualities For Architecture.

Categorie:Geldige begrippen - AQUO. (n.d.). https://www.aquo.nl/index.php/Categorie:Geldige_begrippen

Fernanda Acre, Annemie Wyckmans, Dwelling renovation and spatial quality: The impact of the dwelling renovation on spatial quality determinants, International Journal of Sustainable Built Environment, Volume 4, Issue 1, 2015, Pages 12-41, ISSN 2212-6090,

https://doi.org/10.1016/j.ijsbe.2015.02.001.(https://www.sciencedirect.com/science/article/pii/S2212609015000023)

Reinstra, A., Strolenberg, F., Megens, M., Boer, J., Westerman, J., Loeff, K., van Damme, M., Wansing, R., Grootswagers, L., & Schaap, M. (2020). Kerkgebouwen : 88 inspirerende voorbeelden van nieuw gebruik - van appartement tot zorgcomplex (1st ed.). Blauwdruk.

Rijksmonumenten.nl. (z.d.). https://rijksmonumenten.nl/. Geraadpleegd op 28 oktober 2022, van https://rijksmonumenten.nl/monument/

Rijksmonumentenregister. (z.d.). Rijksmonumentenregister. Geraadpleegd op 28 oktober 2022, van https://monumentenregister.cultureelerfgoed.nl/

Unesco | 2. Kennis van ons erfgoed. (2019, 16 april). Unesco. https://www.unesco.nl/nl/publicatie/world-heritage-in-young-hands-deel-1-de-werelderfgoedconventie/2-kennis-van-ons-erfgoed

Versloot, R. (2021). Repurposed church buildings and its changing public perception through the course of history in the Netherlands | TU Delft Repositories. https://repository.tudelft.nl/islandora/object/uuid:5d981b42-d294-4371-870f-86c0dd4c60f8?collection=education

Haarlem-Amsterdam, B., Asselbergs, F., Rotterdam, B., Projectgroep Belvedere, Bisdom Haarlem-Amsterdam, Bisdom Rotterdam, Roeterdink, N. & Projectgroep Belvedere. (2008). Onderzoek herbestemming kerken en kerklocaties: een inventarisatie vanaf 1970/ Fons Asselbergs. Projectbureau Belvedere.

Ahn, Y. K. (2007, August). Adaptive reuse of abandoned historic churches: building type and public perception. Office of Graduate Studies of Texas A&M University. http://hdl.handle. net/1969.1/ETD-TAMU-1677

Clark, J. (2007). "This Special Shell": The Church Building and the Embodiment of Memory. Journal of Religious History, 31(1), 59–77. https://doi.org/10.1111/j.1467-9809.2007.00545.x

Netsch, S., & Gugerell, K. (2019). Reuse of Churches in Urban and Rural Dutch Landscapes. Acta Horticulturae et Regiotecturae, 22(1), 48–55. https://doi.org/10.2478/ahr2019-0009

Rijksdienst voor het Cultureel Erfgoed. (2019, May). Bouwstenen voor een Kerkenvisie. Xerox/OBT. https://www.cultureelerfgoed.nl/onderwerpen/religieus-erfgoed/documenten/publicaties/2019/01/01/bouwstenen-vooreen-kerkenvisie-handreiking-2019

Rijksdienst voor het Cultureel Erfgoed, de Graaf, A., Hospers, G. J., Péro, M., Renes, H., & Stegmeijer, E. (2014, June). Krimp en erfgoed in Noordwest-Europa; Verkenning van een uitdagend probleem. Rijksdienst voor het Cultureel Erfgoed. https://www.cultureelerfgoed.nl/publicaties/publicaties/2014/01/01/krimp-en-erfgoed-in-noordwesteuropa-verkenning-van-een-uitdagend-probleem

van Damme, M. (2013, September 26). Nieuw leven in lege kerken. ArchitectuurNL. https://www-architectuur-nl.tudelft. idm.oclc.org/inspiratie/nieuw-leven-lege-kerken/

Vdovychenko, N. (2019, June 28). Reusing Churches in the Netherlands. Diggit Magazine. https://www.diggitmagazine. com/articles/church-buildings-reused