Virtues and Vices: Examples of Medieval Knowledge Visualization

Francis T. Marchese
Computer Science Department
Pace University
NY, NY 10038 USA
e-mail: fmarchese@pace.edu

Abstract — **The concepts of virtues and vices have a long history. This paper discusses their medieval metaphorical and allegorical representations as examples of knowledge visualizations, and compares them against the criteria put forward for the use of contemporary knowledge visualizations. It is found that these medieval visualizations exhibit all the essential traits expected of knowledge visualizations, making them not only exemplars of a field, but also documentary evidence of early explorations (research) into visually representing and communicating complex knowledge.**

Keywords - knowledge visualization, medieval art, medieval manuscripts, history.

I. INTRODUCTION

Educating religious and laity about the underlying moral and theological concepts of virtues and vices was an important part of Christian education during the High and Late Middle Ages. Virtues and vices, as abstract notions, have lent themselves to representation throughout history by means of metaphor and allegory.

A metaphor is "something regarded as representative or suggestive of something else, especially as a material emblem of an abstract quality, condition, notion, etc.; a symbol, a token." [1] Metaphors make an analogy between the attributes of a known sign or symbol and the comparable attributes of what is to be represented. In short, a metaphor takes what we know and connects it with what we want to know. Metaphors are the foundation for the creation of many models that are fundamental to science and engineering [2]. The power of a good metaphor is that it makes an immediate, instinctive visceral connection with the viewer, triggering an instantaneous response.

An allegory is an extended form of metaphor; a representational scheme in which objects, persons, and actions in a narrative, poem, or image are equated with meanings outside the narrative itself. The chief purpose of an allegory is to communicate a story using characters, a setting, and other types of symbols that have both literal and figurative meanings. The story's underlying meaning may have moral, social, religious, or political significance, and characters are often personifications of abstract ideas, such as virtues and vices considered here.

Metaphor and allegory have been employed extensively by authors of classical and late antiquity as a rhetorical device for conveying their messages. In Part VII of *The Republic* [3], Plato (c. 427 – c. 347 BCE) puts forward the *Allegory of the Cave*, which communicates his belief that the world revealed by our senses is not the real world but rather a poor replica of it, and that the real world can only be apprehended intellectually. Martianus Capella (c. 410 – 439 CE) employs allegory to stage his encyclopedic work *On the Marriage of Philology and Mercury*, that encompassed the seven liberal arts (grammar, logic, rhetoric, arithmetic, geometry, astronomy, and music), and became a major influence on medieval education. Macrobius Ambrosius Theodosius (c. 395 – 423 CE), an early medieval information visualizer, utilized allegory in his *Commentary on the Dream of Scipio* (*Commentarii in Somnium Scipionis*) [4] to put forward a comprehensive philosophy of nature encompassing arithmetic, astronomy, and cosmology.

Metaphor plays an important role in contemporary knowledge visualization as well. Eppler and Burkhard [5] have identified the kinds of useful metaphors available for knowledge visualization by analyzing real-world objects and systems. Their metaphors fall into four generic groups:

1. Natural phenomena: mountain, iceberg, tree, waterfall, volcano, river, cave, etc.

2. Man-made objects: ladder, wheel, road, bridge, funnel, umbrella, bucket, lever, etc.

3. Activities: climbing, walking, reaching, driving, eating, fishing, harvesting, juggling, pouring, etc.

4. Abstract concepts: family, peace, law, chaos, etc.

In this paper we consider three examples of medieval knowledge visualization that span all four groups. The abstract concepts of virtues and vices will be used to explore visualization of knowledge from Late Antiquity through the High Middle Ages explicitly utilizing historic examples that include dynamic activities, trees, and ladders. We will employ these visualizations as exemplars of this genre, and evaluate them against the criteria put forward by Eppler [6] for appraising contemporary knowledge visualization. To our knowledge, this is the first time such an analysis has been performed. It complements our recent research in medieval visualization [7] [8].

In the following section we will briefly review the history of virtues and vices.

II. HISTORY OF VIRTUES AND VICES

Virtues and vices are ideas related to moral philosophy that have their origins in the writings of Classical Antiquity. References to the four cardinal virtues – prudence, justice, fortitude, and temperance, are found in the Bible (The Wisdom of Solomon 8:7, and 4 Maccabees 1:18–19). Plato describes the four cardinal virtues in *The Republic* (Book IV: 427d – 434c). In his *Nicomachean Ethics,* Aristotle (384 – 322 BCE) discusses moral virtues and their extremes - i.e. vices [9]. The Roman statesman and philosopher Cicero (106–43 BCE) lists the same four virtues in *De Inventione* (c. 87 BCE): "Virtue may be defined as a habit of mind in harmony with reason and the order of nature. It has four parts: wisdom (prudence), justice, courage (fortitude), temperance" (*De Inventione*, II, LIII) [10].

With the rise of Christianity the list of virtues was increased to seven by the addition of the "theological virtues": faith, hope, and charity. The theological virtues are so named because the object of these virtues is the divine being (theos). Catholic theology considers these virtues to be different from the cardinal virtues in that they cannot be obtained by human effort. A person can only receive them by being infused through Divine grace.

Early Christian reflections on vices along with their relationships to virtues, are found in the writings of Evagrius Ponticus (345 – 399 CE), a Greek ecclesiastical scholar who led a monastic life of asceticism in Egypt [11]. His extensive writings were focused on explaining and analyzing vice and virtue, demons and angels, and psychological and psychosomatic phenomena. He devised a list of eight offenses and wicked human passions: gluttony, lust, avarice, sadness, anger, acedia, vainglory, and pride [12]. The monk John Cassian (c. 360 – 435 CE) who founded the Abbey of St. Victor in Marseilles, Gaul (now France) promulgated Evagrius's writings on vices and virtues in the West through his *Institutions* (*De institutis coenobiorum et de octo principalium vitiorum remediis libri XII*) [13], a practical guide for helping monks avoid sin that became part of a monastic practice.

During the early Middle Ages both monastic and lay communities considered vices to be the fundamental classes of evil. In the late 6th century, Pope Gregory I (c. 540 – 604) formally recognized virtues and vices as being of religious importance, and reduced the list of vices to seven by combining vainglory with pride, acedia with sadness, and adding envy to yield: pride, envy, anger, sadness, avarice, gluttony, and lust. The Lateran IV council of 1215 convoked by Pope Innocent III (c. 1160 – 1216) imparted a theological grounding to these beliefs by categorizing them as "deadly sins," and sentencing to those found guilty of some sins, such as those of the "tongue" - gluttony, lechery, or blasphemy, to severe punishments that could involve physical mutilation or dismemberment [14]. From Lateran IV onward, priests were required to sermonize about the vices, and confessing penitents were to be examined on the basis of the seven categories. As a consequence, a spate of guide books and educational materials were produced. The most famous example is William Peraldus's *Summa de vitiis et virtutibus*

(1236 – 1250), a combined volume of his treatises on vices and virtues that was widely transmitted [15]. Indeed, Chaucer's (c. 1343 – 1400) *Clerk's* and *Parson's Tales* draw much of their material from Peraldus [16] [17], and his influence is found in Dante's (c. 1265–1321) *Divine Comedy* as well [18].

III. VISUALIZING VIRTUES AND VICES

The complexity of material which students were required to master made the creation of visualizations desirable. Visualization transcended the limitations of textual learning, enabling the viewer to absorb material more quickly. In the books produced to teach this exegesis, images began to take on an increasingly significant role, ranging from visual summaries of the text to the focal point of a lesson, in which the text served as an introduction to the imagery. We explore three examples of the triumph of virtues over vices, the standard allegorical production. This genre exhibits two main threads of representation. The first is the dynamic view, in which visualizations embody the dynamics of virtue-vice struggle. The second is a static representation in which trees are employed to display theological insight underlying the nature of virtues and vices.

A. Psychomachia

One of the most influential allegories of Late Antiquity was *Psychomachia* (Battle for Man's soul) by Prudentius (Aurelius Clemens Prudentius) (348 – c. 405), the first completely allegorical poem in European literature [19]. *Psychomachia* vivdly portrays seven violent confrontations between opposing virtues and vices in which Christian faith is attacked by, and defeats pagan idolatry. Illustrations prepared to accompany this text, copied and reworked by medieval illuminators, are recognized as playing an essential role in the development of the iconography of the virtues and vices in the Middle Ages [20].

Psychomachia inherits its formal allegorical construction for the triumph of the virtues over the vices from Late Antiquity which drew upon late-Roman battle scenes to depict the struggle. Notable to *Psychomachia* are its personification of virtues and vices as women engaged in combat, at a time when battle scenes were traditionally rendered with male soldiers; and the extraordinary degree of violence portrayed in the poem. For example, Faith (Fides) slays Idolatry (Veterum Cultura Deorum) with a blow, and tramples her victim's eyes underfoot, while Humility (Mens Humilis) decapitates Pride (Superbia). Figure 1 displays a visualization of this struggle taken from the *Speculum virginum* (Mirror for virgins) an illuminated manuscript attributed to Conrad of Hirsau, written as a guide for nuns during the first half of the twelfth century. The figure depicts Humility's victory over Pride, in which she has thrust her sword through Pride's breast. Humility is flanked by two triumphant biblical women - Jeal (left) and Judith (right). Jael stands on the corpse of Sisera, whose head she has pierced with a tent stake (Judges 4:21), while Judith stands on the slain body of Holofernes (Judith 13:1–10).

The merging of biblical women of strength with the female iconography of the virtues and vices demonstrates not

Figure 1. *Humility Slaying Pride, Speculum Virginum* [21].

Figure 2. *Nativity Scene, (MS. Yates Thompson 2, f. 57v, British Library)*

only the artist's understanding of the Bible, but also the ability to blend diverse content and concepts within a flexible schema. In their biblical accounts both Jael and Judith rescue Israel from foreign forces just as Humility and her six virtuous cohorts help save "us" from the seven deadly sins. This image exemplifies the combining (perhaps an early mash-up) of religious texts through the integration of iconography, a process that evolved over time. One archetype is the illustration of the nativity of Christ's birth rendered by medieval and Renaissance artists. Few details are given in the Gospel accounts of Jesus's birth, so artists created an iconography. For example, the appearance of an ox and ass in images representing Christ's nativity scene is due to a quote from Isaiah (1:7): "the ox knows his owner and ass his master's crib; but Israel does not know" (c.f. Figure 2). In another instance, the number of wise men who visited the Christ child in early art varied until the number crystallized into three, attended by a large retinue of animals and people.

The use of violent schema for rendering virtues and vices undoubtedly was condoned by the Catholic Church throughout the High Middle Ages (e.g. see Lateran IV council discussion above), given the gruesome reality of the times. One example may be found in Pope Leo III's attempt to eradicate heresy among the Cathar religious movement in the Languedoc region of France [22]. In April 1210 a procession of approximately one hundred defeated soldiers from the town of Bram wended its way through the streets of nearby Cabaret. All but one solder had his eyes gouged out and noses and upper lips sliced off. The remaining man was spared one eye so he could lead the procession. These men were sent as a warning against the harboring of Cathers [23,

p. 73]. For the medieval Church, the metaphor of Christian warriors defending the faith was not far from the brutal truth.

B. Ladders

One of the earliest uses of ladder as metaphor is the biblical account of *Jacob's Ladder* ("Genesis" 28:12): "And he dreamed that there was a ladder set up on the earth, and the top of it reached to heaven; and behold, the angels of God were ascending and descending on it." In Plato's *Ladder of Love* (*Symposium* 210a – 211b), a lover progressively ascends a seven rung ladder from the basest love of a beautiful body to the most pure form of love – the love of beauty itself. Early Christen writers used the metaphor as well. Origen (c. 184 – c. 253 CE) describes two ladders that are part of Christian life. The ascetic ladder that the soul climbs on the earth increases in virtues with each rung of ascent. In the second, after death, the soul climbs through the heavens up to the light of God. Gregory of Nazianzus (c. 329 – c. 389/390 CE) describes ascending *Jacob's Ladder* towards excellence, interpreting the ladder as an ascetic path.

The most influential allegorical treatise of the early Church, and the one which stimulated its illustration is the *Ladder of Divine Ascent*, written by John Climacus (c. 7th C. CE), a Christian monk at the monastery of Mount Sinai. Written to help monks elevate their bodies and souls to God through the acquisition of ascetic virtues, Climacus used the metaphor of Jacob's Ladder to structure his instruction, making a direct connection between it and the virtues and vices: "The holy virtues are like the ladder of Jacob and the unholy vices are like the chains that fell off the chief apostle Peter. The virtues lead from one to another and carry heavenward the man who chooses them. Vices on the other hand beget and stifle one another" [24, p. 152]. Each manuscript chapter is a "step" in the ladder, and considers a separate spiritual subject. There are thirty steps in all, a number which corresponds to the age of Jesus at his baptism.

Figure 3 displays *The Ladder of Divine Ascent* as depicted in a late 12th century icon from Saint Catherine's Monastery, Mount Sinai, Egypt. The icon portrays monks led by John Climacus climbing the ladder towards Jesus in Heaven, positioned at the top right corner of the image, aided by prayers of angels (upper left corner), and the community (lower right corner). Demons attack the ascending monks, attempting to dislodge them from the ladder by pulling them
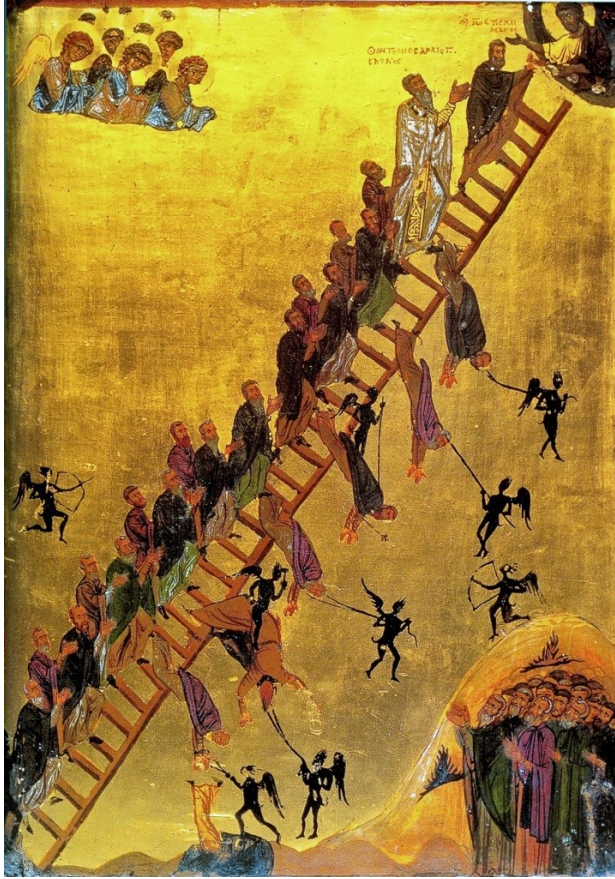
Figure 3. *The Ladder of Divine Ascent, late 12th C. icon, Saint Catherine's Monastery, Mount Sinai, Egypt*

martyr (d. 203 CE) who died in Carthage at the age of twenty-two. During her imprisonment for not renouncing her faith, she dreamt that she stood before a narrow ladder of bronze reaching to heaven. On each side were affixed swords, spears, and knives, with a great serpent lying in wait at its foot – all to dissuade anyone from attempting its ascent. Yet, because Perpetua believed in Christ she scaled the ladder unharmed, arriving in a great garden to be greeted by a white haired shepherd and thousands of individuals clothed in white [25].

down or striking them with arrows. Those monks that have succumbed to the vices portrayed as demons, fall towards the Devil's gaping mouth, shown devouring a fallen monk.

Climacus' treatise was widely disseminated and influential on medieval monastic life. The medieval religious handbook, *Speculum Virginum*, is a representative example of its influence, containing both textural and visual allegorical representations [25]. Besides the Humility–Pride allegorical visualization discussed above, *Speculum Virginum* contains the *Ladder of Virtue* shown here in Figure 4, from a British Library's copy of the manuscript (MS. Arundel 44, fol. 93v, British Library). Christ resides at the ladder's top, guarded by a dragon at its bottom, and an Ethiopian protecting its ascent. A young nun approaches Christ, who holds here golden branches in His hands, the signs of reward. The surrounding virgins have enabled the young nun to reach this height through their strength and resoluteness, skewering the evil dragon and dislodging the weapons from the Ethiopian [26].

The *Ladder of Virtue* is based on two passages in *Speculum Virginum*. The first is the twelve step ladder of Humility (*De Humilitate*), a framework for helping monks achieve holiness throughout monastic life; written by St. Benedict (c. 480 – 547), the founder of Western monasteries. The second is from a dream by Perpetua, an early Christian

Figure 4. *Ladder of Virtue, Speculum virginum (MS. Arundel 44, fol. 93v, British Library)*

It is clear that metaphor runs through the entirety of *Speculum Virginum*. The manuscript contains twelve chapters and twelve illustrations. St. Benedict considers *Jacob's Ladder* to be the prototype for his twelve-step ladder of Humility [27]. And although Perpetua does not explicitly
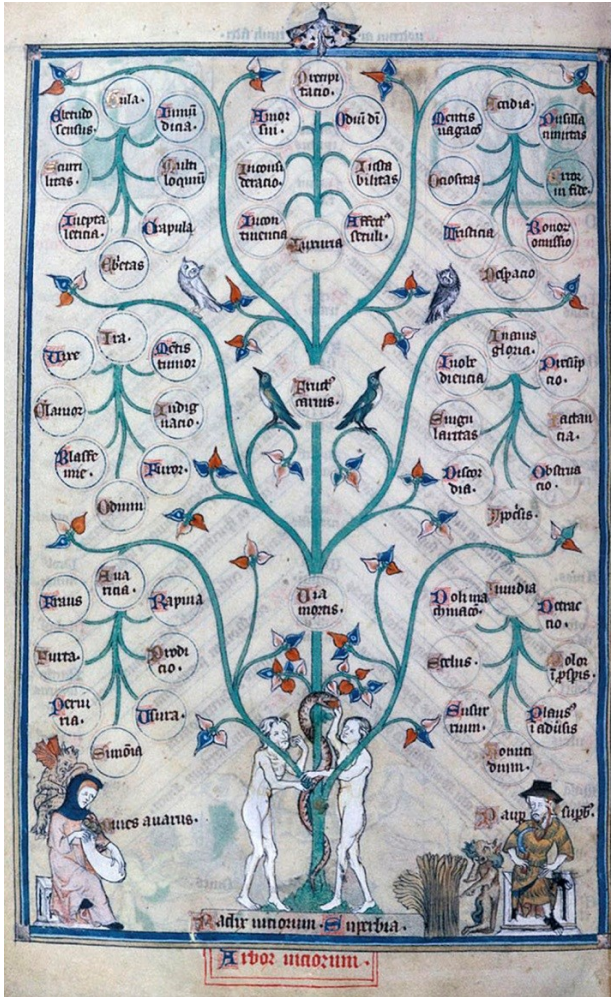
Figure 5. *Tree of Vices, (MS. Arundel 83 II, fol. 128v, British Library*

Figure 6. *Tree of Virtues (MS. Arundel 83 II, fol. 129, British Library)*

allude to it in her diary [26], *Jacob's Ladder* was prominent in the African Christian catechesis of her time period [28, p. 155]. Finally, the term "speculum" or mirror was employed as a metaphor for contemplation [29], in which an individual reflects upon Holy Scripture or events in the perceptual world. Indeed, that was an important objective of *Speculum Virginum* – to provide a useful tool for nun's to reflect on this religious text, and the exegetic imagery based on that text, so they could realize their aspirations to greater spirituality.

C. Trees

The use of trees as visualization schema was pervasive throughout the Middle Age. They were exploited for organizing and representing lists of useful facts such as virtues and vices, books of the Bible, or lineages, so as to make them more amenable to learning [30].

Medieval trees of virtues and vices are systematized schema, employed to illustrate correct and incorrect spiritual paths, providing a formal paradigm by which monks could interpret and contemplate the associations between each conceptual abstraction. Figures 5 and 6 display trees of vices and virtues respectively, taken from the *De Lisle Psalter* (c.
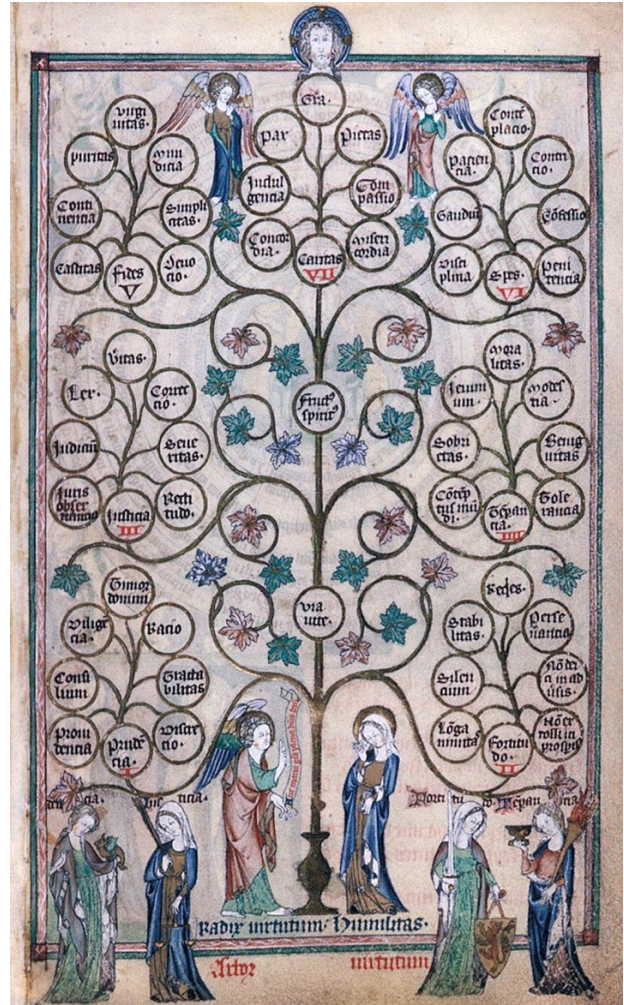
1310) (MS. Arundel 83 II, British Library). Comparing the general structure of these trees one immediately notices that fruits on the tree of virtues point upward, while the fruits on the tree of vices point downward. This configuration was put in place to remind monks that following a path of virtue would lead up to heaven; while a path of vice would lead down to hell.

The Tree of Vices (Figure 5) has Pride (Superbia) at its root, and grows from the Original Sin of Adam and Eve, shown at the tree's base, with the serpent coiled around its trunk. There are seven branches culminating in circular clusters (fruit). Moving up the tree's trunk the reader passes two nodes labeled: "way toward death" and "fruits of flesh," arriving at the apex node of lust, we find it situated between the vices gluttony and sloth. Each major vice is connected to secondary decadent attributes. For example, under gluttony are sensuality, vulgarity, silliness, drunkenness, inebriation, talkativeness, and uncleanness [31]. A rich miser sits at the bottom left of the Tree, holding a sack of gold coins, with a devil perched on his back. A proud peasant sits at the lower right with a devil sitting before him. The Tree is also adorned

363

with birds, owls, and moths perching on branches. These represent the underworld. The organization of vices within the tree is shaped by a number of issues. Avarice became an important vice with late medieval monks, who were acutely critical of the morals of merchants. As a result, it became a foundational vice. Lust was exceptionally problematic for monks, given their vow of celibacy and isolation, so it was placed at the tree's pinnacle [32, p. 67].

The Tree of Virtues (Figure 6) is rooted in humility (Humilitas); grows from purity, as represented here by the Virgin's Annunciation; terminates in seven branches of circular clusters, each representing one of the seven virtues and their seven respective secondary qualities; finally culminating with a head of Christ bounded by two angels at the Tree's apex. The four theological virtues (prudence, justice, temperance, and fortitude) encompass the lower four categories in Figure 6, displayed in turn, clockwise, beginning with the lower-left branch. The three cardinal virtues top the tree, presented in the order: faith, charity, and hope [32]. The tree is decorated with personifications of the four cardinal virtues at its base, with fully formed, healthy leaves interspersed among the branches. In contrast, the leaves on the Tree of Vices are withered and small, supporting the unhealthy nature of the path to hell.

The Trees of Virtues and Vices share the same general structure of branches and nodes. Although the schematic representation of virtues and vices developed independently, early authors such as Prudentius in his *Psychomachia* set them in opposition. This is seen as well in the parallels between the symmetric layout of virtues and vices in their respective trees, with each possessing seven subsidiary attributes. Although there is a positional correspondence between some virtues and vices, such as lust in the Tree of Vices with charity in the Tree of Virtues, the remaining oppositions do not precisely match up. Yet, these illustrations were clearly meant to be studied in concert, because they not only occupy facing pages in the manuscript, as shown in the side-by-side relationship between Figures 5 and 6; but also the Tree of Vices occupies the left (Latin: sinister) page, and Tree of virtues occupies the right (Latin: rectus). Such an arrangement is consistent with the late Roman and medieval belief that the left-hand side represented an ill omen, and eventually evil. So following the left-handed tree would lead to damnation, while following the right-hand tree was the cor*rect(us)* path to salvation. In sum, viewers could readily reflect on and between the paths to salvation or damnation. And, because of the a tree's hierarchical organization of the moral code within it, Trees of Virtues and Vices presented a straightforward path toward learning and deeper understanding, beginning with essential virtues and vices, followed by their secondary attributes.

IV. ANALYSIS

According to Eppler [6], a knowledge visualization must fulfill seven criteria.

The first criterion is that a visualization must be able to capture and depict knowledge, composed of insights, experiences, concepts, perspectives, opinions arguments etc. of informed participants. As we have seen, the rich intellectual history behind the concepts of virtues and vices has been captured in a diversity of visualizations. From the allegorical imagery of *Psychomachia* to the Trees of Virtues and Vices, these rhetorical constructions have the goal of instructing the faithful about the inner conflict between virtues and vices for Man's soul.

Eppler's second criterion is that a knowledge visualization ideally should contain insights from more than one entity alone, and relate these ideas to one another. All three visualizations blend a variety of sources, including the Bible, and works of ancient and medieval scholars.

According to the third criterion, a knowledge visualization must be visual in the sense that the knowledge mapped in the image is spatially positioned within a diagram, visual metaphor, sketch, map, or photograph, or combinations thereof. Clearly, all three visualizations meet this criterion by arranging knowledge in such a way as to show the relationships among components. The Trees of Virtues and Vices are designed in this way. The image of Humility Slaying Pride (Figure 1) and those of the "Ladders" (Figures 3 and 4) do this to construct a narrative.

Eppler's fourth criterion states that a knowledge visualization must support the process of knowledge integration among various people by facilitating either synchronous or asynchronous conversation. Because each of these visualizations was part of an educational handbook, it could be used with or without tutorial supervision. And there was an expectation that each visualization would be used for individual reflection.

The fifth criterion states that a visualization must be revisable or flexible, so as to be able to react to changing insights in a group over the course of time. Each of these schemas evolved over time. The "Ladder" visualizations considered here progressed from *Jacob's Ladder* to The *Ladder of Divine Ascent* to the *Ladder of Virtues.* The "Tree" schema evolved over time. Those considered here represent an advanced schema with the layering of more evocative imagery.

Eppler's sixth criterion states that a knowledge visualization must be communicable in the sense that the image can be communicated to individuals of different backgrounds who had not been present during its creation. These visualizations were part of guide books and educational materials that, although designed for educations of clerics, they became part of general Christan education. Indeed, the *Speculum Virginum* was originally designed for the education of nuns, but it became popular for monks as well.

Finally, a knowledge visualization's use leads to new discoveries or insights that were previously unknown, and that are useful to viewers of the visualization. These medieval visualizations were the focal point for inward reflection, the goal of which was to help an individual discover those qualities within that would lead to achieving a higher level of spirituality. Hence, the discovery of personal insights was essential to these visualizations' utility.

V. FINAL THOUGHTS

This paper has explored medieval knowledge visualization, utilizing the metaphorical and allegorical representations of the concepts of virtues and vices as examples. Three kinds of visualizations were considered: the personification of virtues and vices as warriors, in a dynamic struggle for humanity's souls; the use of ladders to represent the sequence of personal achievements required to realize a heavenly goal; and the depiction of virtues and vices as trees. It has compared them against Eppler's criteria for the use of contemporary knowledge visualizations, finding that these medieval visualizations exhibit all the essential traits expected of knowledge visualizations, making them not only exemplars of a field, but also documentary evidence of early explorations (research) into visually representing and communicating complex knowledge.

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