

ABSTRAK

PERANCANGAN PRODUK MAINAN EDUKASI STEM 3D-PRINTED BUILDING BLOCK STRUCTURE MENGGUNAKAN QUALITY FUNCTION DEPLOYMENT (QFD)

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Perkembangan sistem kognitif remaja perlu diakomodasi melalui banyak metode, salah satunya mainan berbasis STEM (Science, Technology, Engineering, Mathematics). Mainan berbasis STEM dapat melatih kinerja kognitif, motorik, dan imajinasi remaja sehingga mereka dapat mengaplikasikan pembelajaran ke dalam hal yang lebih menarik. Salah satu jenis mainan STEM adalah building block structure yang dapat dimanufaktur menggunakan 3D-printer. Penggunaan 3D-printer dapat menekan biaya dan waktu produksi. Perancangan mainan STEM yang dimanufaktur oleh 3D-Printing menggunakan proses analisis QFD (Quality Function Deployment) sehingga dapat mengakomodir kebutuhan konsumen dan memproses kebutuhan tersebut ke dalam perencanaan teknis produksi. Berdasarkan metode QFD, didapat bahwa kebutuhan konsumen terhadap mainan STEM menghasilkan rancangan building block berupa beam dan connector yang dimanufaktur menggunakan material PLA (Polymer Polyactid Acid) dapat dirakit untuk membangun miniatur jembatan. Perakitan miniatur jembatan memerlukan total 142 komponen dengan biaya Rp. 93.792 dimana harga ini relatif murah dibanding dengan kompetitor yang ada di pasaran.

Kata Kunci: *STEM, QFD, building blocks, 3D-printing.*

ABSTRACT

DESIGN OF STEM 3D-PRINTED BUILDING BLOCK STRUCTURE EDUCATIONAL TOY PRODUCTS USING QUALITY FUNCTION DEPLOYMENT (QFD)

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The development of adolescents' cognitive systems needs to be accommodated through many methods, one of which is STEM-based toys (Science, Technology, Engineering, Mathematics). STEM-based toys can train adolescents' cognitive, motor, and imagination performance so that they can apply learning to more interesting things. One type of STEM toy is a building block structure that can be manufactured using a 3D-printer. The use of 3D-printers can reduce production costs and time. The design of STEM toys manufactured by 3D-Printing uses the QFD (Quality Function Deployment) analysis process so that it can accommodate consumer needs and process these needs into production technical planning. Based on the QFD method, it was found that consumer needs for STEM toys resulted in building block designs in the form of beams and connectors manufactured using PLA (Polymer Polyactic Acid) materials that can be assembled to build miniature bridges. The assembly of miniature bridges requires a total of 142 components at a cost of Rp. 93,792 where this price is relatively cheap compared to competitors on the market.

Keyword: STEM, QFD, building blocks, 3D-printing.