From our tutorial we were given the linear transformation

$$\mathcal{C}(\vec{x}) = \vec{0}$$

And that the rank of $\mathcal{C}$ was 0. I was a bit confused by this as the range is the set

$$\left\{\vec{0}\right\}$$

And a basis for that set is

$$\left\{\vec{0}\right\}$$

and the size of that set is 1 so shouldn't the dimension be 1 $\Leftrightarrow$ range is 1?